AMERICAN

STATISTICAL ASSOCIATION.

NEW SERIES, No. 20. DECEMBER, 1892.

THE ESTABLISHMENT OF AN IMPERIAL COMMISSION FOR LABOR STATISTICS IN GERMANY.

By Carl C. Plehn, Ph.D.

Until very recently little attention has been given, in Europe, to the establishment of special bureaus for the collection of labor statistics. In England the Labour Bureau of the Board of Trade dates only from 1886,[1] although special parliamentary and crown commissions have from time to time investigated different phases of the "Labor Question." In Switzerland the Confederated Laborers have since 1887 been allowed a Secretaryship for Laborers, part of the expenses of which are paid from the national treasury. It was only last June that France established her *Office du travail*, and Italy, though discussing the matter, has not to my knowledge taken any final step.

It would, however, be incorrect to conclude that no statistical material was to be had from these countries relating to the condition of the laboring classes, for, on the contrary, much has been furnished by other statistical bureaus. So vitally are the questions which concern the laborer connected with all problems of social organization that this is unavoidable.

[1] *Publications of the American Statistical Association*, June, 1889, p. 271.

The regular census enumerations give us comparisons of the laboring class with the whole population, of trade with trade, and of skilled with unskilled, in point of numerical strength. This of itself is an important piece of labor statistics. The census gives also the size of families, condition as to wedlock, dwellings, etc. The regularly collected statistics of the movement of population is another very valuable source of such information. A still closer approach to the field of labor statistics is made in the statistics of Industries (*Betriebsstatistik*), meaning by industries every place of employment of labor, agricultural or manufacturing, large factory or small shop. This comes nearest to being labor statistics, in the narrower sense, when the characteristics which are made the basis of the inquiry are chosen not with reference to the amount of their product, but with especial reference to the light they may throw on the condition of the laborers employed. For example, the agricultural laborer is quite a different man when employed on a large farm with machinery and a large number of co-laborers than when he "farms it" alone on an acre or two. The cobbler who makes shoes only occasionally as an adjunct to his regular business of repairing is very differently situated from the operator who sews a Goodyear welt by machinery in a large factory. And these distinctions are generally recognized in collecting statistics of industries.

What, then, do we mean by labor statistics? And what is the special field for a Bureau of Labor Statistics? The distinction is not so much one of material as it is one of point of view. It is the social problem viewed from a special standpoint.[1] It is the business of the statistician in this case to ascertain how those persons are situated who live entirely or principally from the wages of their toil. It is, now, a question of classification, of separating the whole population into groups, and putting the laboring class by itself in con-

[1] Cf. v. Inama-Sternegg. *Arbeitsstatistik.* In *Statistische Monatsschrift* (*Austrian*), *Vienna*, xviii, 3, March, 1892.

trast to the others. For this purpose we have to investigate wages (form and amount), the quality of the labor, the hours of labor, the standard of living, the operation of factory laws, the mobility of the laborer, etc., and there are questions which demand a more direct and individualistic treatment, case by case, than they could have in any general census or industrial statistic.

And, secondly, it is the statistician's duty here to investigate the effects on society, as a whole, of the conditions thus imposed on the laboring class. We have to consider that class not so much as an important agent in production as an element of the total population, and whose well or ill being will reflect on the whole of society.

While it is clear, then, that the census returns, the statistics of movement of population, of industries, of immigration, of crime and pauperism, and many others, may not improperly be said to be the basis of all labor statistics, yet it is none the less clear that there is a limit beyond which they cannot well go. If, for example, we should attempt to unite some of this work with the census, what would be the result? To be sure, to increase the length of the schedule would entail but little additional expense and labor, so far as collection alone is concerned, but it would militate seriously against the accuracy of the results attained. To approach the individual with more than twelve or fifteen questions arouses opposition and leads to confusion in the replies. Moreover, the work of verifying, collating, and formulating the results of more numerous inquiries is vastly increased, as the number of possible combinations becomes greater.

As the result of considerations similar to the above, and in view of the ever increasing necessity from political considerations, of having reliable and complete statistics of labor, a movement has begun in Europe for the establishment of special bureaus. Some of these are enumerated in opening. No line of investigation in the whole field of sociology strikes more directly at the very tap-roots of the social problems than this investigation of the conditions of labor.

It is very strange that Germany, otherwise always so ready to favor and further a scientific treatment of important questions, should be almost the last to come into line and establish a special bureau for labor statistics, and does so even now in an extremely half-hearted and meagre fashion.

The history of the movement, which now bids fair to bear some fruit in the establishment of an Imperial Labor Commission, may be briefly summarized as follows:[1] In 1868 the Social Democrats proposed, in the Reichstag of the North German Confederation, the establishment of a parliamentary commission, modelled after the English, for the investigation of the situation of the laboring class, and to aid in formulating reforms. In the greater interests of the time, centering in the changes in the constitution, this proposal, although it had apparently met the approval in principle of all political parties, was never acted upon. The question was not brought up in Parliament again until 1885. Meanwhile, since 1878, the reports of the factory inspectors formed a valuable, though by no means sufficient, source of information on labor statistics. In 1885, on the occasion of a revisal of the laws regulating industry (*Gewerbeordnung*), the Social Democracy brought forward two conjoined propositions, one for the official collection of wage statistics, and another for the establishment of labor bureaus, which should, besides executing other functions, collect labor statistics. On this no action was ever taken. In May, 1890, the same party brought forward two separate propositions, of a similar nature, and, almost at the same time, Representative Siegle (National Liberal) introduced a bill looking in the same direction. The proposition of the Social Democracy did not reach its first reading until December, 1891. It passed the first reading without much opposition, but the close of the session prevented the second and third readings. Siegle's bill was, however, adopted by the Reichstag in January, 1892. The

[1] Cf. Braun, *Die Errichtung einer Kommission für Arbeiterstatistik.* In *Archiv für Sozial Gesetzgebung und Statistik.* Bd. v. Heft 1.

execution of Siegle's plan,[1] which, though very comprehensive in its general outlines, was not well worked out in the details, was prevented by the creation of a Commission for Labor Statistics, by the Bundesrath. The *Regulativ* for this commission came down to the Reichstag last March, and falls far short of realizing the hopes of those most interested in the establishment of an effective Labor Bureau.

The Commission is, so runs the *Regulativ*, established to assist, by collecting statistical information, in the carrying out of the industrial laws (*Gewerbeordnung*); this relates solely to manufacturing industries, agriculture not being included. It consists of 13 members. The chairman and one other member are appointed by the Chancellor, the latter to be from the official staff of the imperial statistical office (*des k. k. statistischen Amts*). The Bundesrath elects five and the Reichstag six. The appointed members hold office five years, the elected for the life of the Reichstag. The duties of the commission, subject to the instruction of the Chancellor and Bundesrath, are: (1) to consider the advisability of undertaking statistical inquiries, the method of collection, and to formulate the results; (2) to lay before the Chancellor propositions for the above purposes. The Commission has the right to add to its body, in equal numbers, employers and employes, who shall be allowed to speak on the proceedings, and in case the statistics collected need explanation they may call witnesses. Employers and employes must be called when the Bundesrath or the Chancellor demand it. The commissioners are unpaid, but expenses are to be reimbursed, and, in the case of laborers, expenses shall be construed to cover wages lost by loss of time. The Commission can only meet when called by the Chancellor, or by his permission. The Chancellor and each State of the Empire have the right to be heard before the Commission.

Two things at once strike the reader of this *Regulativ*:

[1] Cf. Wörishoffer, *Die Aufgaben der Reichskommission für Arbeiterstatistik.* In Schäffle's *Zeitschrift f. d. gesamte Staatswissenschaft*, xlviii, 3, 1892.

(1) That the Commission is expressly organized for a certain and limited object; the investigations are only to further the carrying out of existing laws. Its work, then, will depend largely on the needs of the government in executing those laws; it can strike out in no independent line. (2) The majority of the commissioners are representatives of the government. The Bundesrath and Chancellor appoint or elect seven members out of the thirteen directly, and if the parties in the Reichstag are fairly represented, from two to three more will be of the government's party. There is then no thought of creating an independent, impartial, scientific bureau. This course is directly in the face of all precedents in other countries. At least, the ostensible intention in the establishment of the twenty-one state labor bureaus, and the national bureau in the United States, has been to make the office independent. The same is true of the other labor bureaus and commissions in Europe, as mentioned above. The parliamentary commissions in England, after which the German commission is apparently modelled, are preëminently impartial. This parallel with the English committees goes farther, in that the Commission can summon employers and employes, and call witnesses. But here the comparison stops, for the proceedings of the English committees are public, and volunteered testimony is gladly heard. The German bureaucratic traditions will allow, of course, of only private sittings.

It must not be forgotten, too, that the commission in which the government has taken such pains to secure a majority, is yet absolutely subject to the control of the Chancellor; can only act by his permission, and even with that permission the limit of its power is reached when it considers the advisability of certain investigations. The *Regulativ* does not define which department of the government is to carry out the investigations when recommended by the Commission and approved by the Chancellor. Presumably, this duty would devolve on the imperial statistical office, an office which, if

we may trust the views of its director, Dr. H. von Scheel, as expressed in the *Allgemeine Zeitung* (Munich), Sept. 18, 1890, is entirely inadequate to cope with so serious a problem.

The usefulness, then, of this new Commission for Labor Statistics will depend entirely on the attitude of the government toward it. It, of course, remains within the power of the Chancellor and Bundesrath to give the Commission such scope and freedom that it can grow to an active, useful body. It is, however, much to be feared that, according to the general run of German politics, the Commission will sink into an obedient, applauding echo of the Chancellor's opinions. It is to be hoped that the interest attaching to the matters which fall to it for consideration will prevent its suffering the fate which overwhelmed the Prussian Central Statistical Commission, a body which, though it had originally much more autonomy than the Labor Commission, has not even met for many years. An extension of the Commission's functions, so as to apply to agricultural labor, is also needed. At present they cover only the laborers affected by the *Gewerbeordnung*. Why the agriculturalists were omitted was not made clear at the time of the adoption of the *Regulativ*.

It is to be hoped that this Commission will be the entering edge of the wedge, and that a more effective bureau may be later established. Certainly, in view of the growing political power of the laboring class in Germany, it would be wise to have their interests disinterestedly studied.

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FRENCH STATISTICAL PUBLICATIONS.

By Charles D. Hazen.

The gathering of statistics in France began to assume some importance toward the close of the Old Régime, but it is only more lately, under the Second Empire and the present Republic, that they have been treated in some measure as a science, and their preparation and periodic publication have come to be an important branch of governmental activity. In this article an endeavor is made to show the range of the statistical publications of the different departments of the French government. There is an important class of works carried on by private associations, learned societies, etc., and appearing with more or less regularity, which are of undoubted scientific value to the statistician. The number and importance of the regular official publications have, however, precluded my attempting a description of these in the present article; and even of some of the official publications of minor importance I have been compelled to give simply the name without description. I have also added a brief statement of the statistical publications of the city of Paris as being of too great importance to be entirely omitted in a study like the present.

Ministry of Commerce, Industry, and the Colonies.

This Ministry issues a large number and many of the most valuable statistical publications of France. Among these may be mentioned the following: —

Moniteur officiel du commerce. Appears weekly.

Résultats statistiques du dénombrement.

Statistique de la France. First series, 1837–52; second series, 1855–72; third series, 1874–92.

Annuaire statistique de la France, 1878–92. 15 vols.

Bulletin consulaire français. Begun in 1876.
Annales du commerce extérieur. Begun in 1843.
Statistiques coloniales.
Statistique des primes à la construction et à la navigation.

The *Moniteur* is a weekly journal dating from 1883, and contains varied information relative to commerce, industry, and navigation, such as extracts from French consular reports, reports from French and foreign chambers of commerce, French and foreign commercial legislation, imports, exports, etc. The general results of the census appear every five years in the second title given above. The *Statistique de la France* is the name given to three series of publications dating from 1835, and comprising now some fifty volumes. At present a volume appears yearly, and gives statistics relating to the population, as marriages, births, deaths; statistics concerning the centers of population, relating to tolls, consumption of the large cities, workmen's salaries, public institutions, such as hospitals, asylums, pawnshops; also agricultural and industrial statistics.

Perhaps the most important of all French statistical publications is the *Annuaire*, a thick book of 600 pages, now in its fifteenth year, and reproducing, upon as uniform a plan as possible, statistical documents of every sort emanating from the different ministries, and many of which also appear in other official publications. The scope of the work is revealed by the headings of its different parts: territory and population, movement of the population, religion, criminal justice, civil and commercial justice, penal institutions, charitable institutions, public instruction, fine arts, agriculture, industry, commerce, navigation, fisheries, electoral and military statistics, finances and imposts, Algeria and Tunis, colonies and French possessions. Under these different heads the totals of the year are compared with those of the four preceding years, while a résumé permits one to extend these comparisons from the very origin of these statistics down to the

present moment, thus constituting a veritable statistical history of France. Another of the more important publications of this ministry is the *Bulletin*, a monthly publication of some hundred pages, giving information as to the economic condition of the different countries of the world, the state of their industry, trade and navigation, and their commerce with France, etc. The *Annales* appear monthly, and contain the commercial legislation of the principal foreign countries, tariffs, commercial treaties, conventions, etc. This ministry also issues the volume *Statistiques coloniales*, an annual compilation of important material on colonial statistics. Census, mortality, commercial, educational, penal, financial, industrial statistics are set forth in this general exposé of the life and activity of the colonies. The *Statistique des primes*, published yearly, gives tables of the subventions awarded the merchant marine, of the encouragement extended sea fisheries, etc. Besides these statistical collections this ministry also publishes annually the following works: —

Situation économique de la France pendant les 15 dernières années.
Situation économique et commerciale des pays étrangers.
Statistique du personnel medical de la France.
Rapport sur les caisses d'épargne.
Rapport sur les opérations de la caisse des rétraites pour la viellesse.
Rapport sur les opérations de la caisse d'assurance en cas de décès ou d'accidents.
Rapport général sur les épidémies.
Rapport général sur le service des eaux minérales de la France.
Rapport de la commission permanente des valeurs de douane.

A descriptive catalogue of the machines and processes for which patents have been granted is published annually (*Description des machines et procédés pour lesquels des brevets d'invention ont été pris*, etc.).

Ministry of the Interior.

The general census is taken every five years by this ministry, and is reproduced in detail in the *Recensement*.

This ministry publishes the following reports: —

Recensement quinquennal de la population par département, par canton et par commune.
Relevé des travaux des conseils de préfecture.
Statistique de l'émigration par les ports français.
Situation financière des communes et des départements d'après les budgets primitifs.
Situation materielle et financière des communes d'après les comptes définitifs.
Compte rendu général des opérations effectués par le service vicinal.
Statistique triennale de l'Algérie.
Exposé de la situation générale de l'Algérie.
Rapport sur les services de l'administration pénitentiaire.
Rapport sur les opérations de secours mutuels.
La statistique sanitaire des villes de France.
Album de statistique graphique.

The emigration statistics appear triennially, and include tables indicating the number, the sex, the age, profession, place of embarcation and the destination of the emigrant. The object of this publication is to make known the ethnological and commercial importance of emigration, and to measure its effect upon the agriculture and industry of the departments furnishing the emigrants. The Ministry of the Interior furnishes abundant financial statistics concerning the communes, in various reports in the above list. Statistics relating to Algeria are published for the most part either in the *Statistique triennale*, or in the *Exposé*, which appears annually.

Ministry of Public Works.

This ministry collects and publishes extensive statistical information concerning railroads, public highways, waterways, the exploitation of mines, the application of steam in the economic life of the nation, as in factories, locomotives, steamboats, etc. In the number and variety of its statistical publications, this ministry vies with the Ministry of Commerce. Among these may be mentioned: —

Le répertoire méthodique de la législation de la navigation et des routes.
Recensement de la circulation des routes nationales.
Résultats généraux d'exploitation des tramways.
Etat de la longuer des routes nationales.
Etat itineraire des routes nationales.
La statistique de la navigation intérieure.

The first of these contains all legislation affecting circulation upon the land or water routes. The second is a work appearing at irregular intervals, showing the amount and the nature of the circulation upon the public highways.

Perhaps the most important statistical labors of this ministry are those concerning railroads. These statistics began in 1858, when a statistical history of French railroads, from 1823 to 1855, appeared under the title *Documents statistiques sur les chemins de fer.* Nothing further appeared until 1863, when the regular annual publication of the *Situation des chemins de fer français* was begun. In 1869 a new series of railroad statistical documents was undertaken called *Statistique des chemins de fer français.* This appears now at the close of each year, and contains detailed information about the condition of the grants, a statement of the property of the different railroads, a résumé, by line, of expenses and receipts, of the circulation of travellers, of the transportation of merchandise, and also full statistics of Algerian and colonial railways. Owing to the great development of the railway system of France, and to the increased statistical material brought together in the annual publications, the preparation and printing of these works demand so much time that they gain publicity only some years after the period which they cover. To meet the demand for immediate imformation the more important matter is published in the *Statistique des chemins de fer français, documents principaux.* Other statistical publications of this class are: —

Répertoire méthodique de la législation des chemins de fer français.
Résumé, par ligne, des dépenses de premier établissement et des résultats de l'exploitation.

Bulletin comparatif des recettes des chemins de fer (great lines).
Chemins de fer français d'intérêt général. Recettes de l'exploitation. (Monthly.)
Chemins de fer français d'intérêt local. Résultats de l'exploitation. (Quarterly.)
Ouvertures, concessions, et déclarations d'utilité publique.

The first of these contains all legislation affecting railways. In the second are given the number of kilometers exploited, the subventions awarded by the state, and the receipts and expenses of the great lines.

Other important publications emanating from this ministry are: —

Statistique de l'industrie minérale et des appareils à vapeur en France et en Algérie.
Statistique de l'industrie minérale. Production des combustibles minéraux, fers, fontes, et aciers.
Statistique des sources minérales de la France.

This ministry has also published —

Album de statistique graphique.
Atlas des ports étrangers.
Atlas des canaux.

The first of these contains exhaustive statistics upon the mineral industry of the country, including the results of the exploitation of the mines, quarries, peat-beds of France, the number and the salaries of the miners, the production by department and by basin, the number of accidents occurring in the mines; statistics upon the use of steam machinery, upon the accidents caused by steam, etc. In the third the yield of the mineral springs of France is given.

Ministry of Finance.

This ministry has for a long time gathered statistics, as indeed the necessities of taxation have compelled it to do. The Customs Department, for instance, has a statistical past

of considerable age. But financial statistics entered upon a new era in 1877, when M. Léon Say created a Bureau of Statistics and Comparative Legislation, and established a monthly bulletin by means of which this bureau might communicate with the legislature and the public. This bulletin gives immediate publicity to the more important labors of the bureau. The chief publications relating to the budget are: —

Projets de lois portant fixation des budgets.
Comptes généraux de l'administration des finances.
Comptes définitifs des recettes.
Comptes définitifs des dépenses.

The Ministry of Finance also publishes the following commercial statistics: —

Tableau général du commerce de la France avec ses colonies et les puissances étrangères.
Tableau décennal du commerce de la France avec ses colonies et les puissances étrangères.
Tableau général des mouvements du cabotage.
Compte, en matières et en deniers, de l'exploitation du monopole des tabacs.
Tarif officiel des douanes de France.

The first of these is an annual publication of seven hundred folio pages, in which are found a general résumé of imports and exports; summaries classed by importing and exporting countries, according to the nature of the product or merchandise, and according to ports of entry and departure. Statistics are inserted upon the cod and herring fisheries, upon the effective force of the French merchant marine, etc. The *Tableau décennal* treats of much the same subjects, but in a condensed form and covering a longer period. By comparisons made with the previous decennial publications, information is given concerning French commercial activity during a period of sixty years. The third publication gives statistics relating to the coasting trade; the fourth furnishes extensive

information about the tobacco trade, a government monopoly in France. The tariff laws, customs regulations, commercial treaties of France, appear in the *Tarif officiel.*

The National Mint publishes an annual report. The Ministry of Finance has made some very important contributions to statistical knowledge by different investigations it has conducted, as one in 1878, *Sur la circulation metallique en France;* in 1879, *Sur les boissons*, etc.

Ministry of War.

The chief publications of the Ministry of War are: —

Compte rendu sur le recrutement de l'armée.
Compte de l'emploi des crédits affectés à l'inscription des pensions militaires au Trésor public.
Compte général de l'administration de la justice militaire.
Statistique medicale de l'armée.

The first shows the distribution of the recruits among the different divisions of the army and navy, their physical development, their education, and occupation; the exemptions from service granted, voluntary engagements, reëngagements, etc. The second contains complete pension statistics. The third of these publications shows the crimes and misdemeanors of the soldiers, punishments imposed, etc. The prisoners are considered with reference to the division of the army to which they belong, to their rank, grade, time of service, and education.

Ministry of Marine.

The publications of the Ministry of Marine are: —

Notices statistiques sur les colonies françaises.
Notice sur la transportation à la Guyane française et à la Nouvelle-Calédonie.
Compte général de l'administration de la justice maritime.
Statistique des pêches maritimes et de l'ostréïculture.

The first contains very general legislative, financial, statistical, and historical information about the different colonies.

The second furnishes data as to the number of convicts in the penal institutions of these two colonies, their crimes, punishment, convict labor, prison schools, sanitary condition, etc. The last is a statement of the sea fisheries and of fish culture.

Ministry of Public Instruction.

This ministry printed in 1868 a large folio volume, *Statistique de l'enseignment supérieur*, containing abundant statistical information upon the different faculties of the University, the higher technical and scientific schools, different literary and scientific institutions, such as the Institute, College of France, *Ecole des Chartres*, public libraries, free lecture courses, etc. It publishes at irregular intervals a *Statistique de l'enseignment secondaire*. The latest volume appeared in 1889 and covered the years 1876–87. It furnished varied statistics upon higher education, general condition of the lycées, communal colleges, normal schools, their financial status, educational work, etc.

Further statistics concerning education are found in —

Statistique de l'enseignment primaire.
Statistique de l'enseignment primaire supérieur.
Résumé des états de situation de l'enseignment primaire.
Enquêtes et documents relatifs à l'enseignment supérieur.

These *Enquêtes* are a considerable series of reports (now forty, more or less) published at irregular intervals and bearing upon different phases of higher education.

Ministry of Agriculture.

This ministry publishes the *Statistique agricole annuelle*, which gives the yield of the different agricultural products, statistics upon prices, upon the consumption of Paris, and the importation and exportation of agricultural produce. The *Etats des récoltes des céréales*, covering the period from 1816 to 1876, and the *Etat définitif des récoltes*, published annually since then, furnish an uninterrupted series of agri-

cultural statistics from 1816 to the present day. In 1872 appeared the *Prix moyen et annuel de l'hectolitre de froment, 1800–1871.*

The Bulletin of this ministry appears eight times a year, and contains official documents, budgets, laws, statistics of animal diseases, of the importation and exportation of cattle, of the harvests, prices of bread, meat, etc., by departments, as well as other agricultural information.

This ministry also publishes —

Etat approximatif de la récolte en blé, seigle, et méteil.
Poids officiel des grains.
Récolte de la soie.

The Ministry of Agriculture has published beside statistical documents, properly so-called, (1) a series of volumes called *Primes d'honneur*, a collection of monographs upon agricultural subjects, and (2) the results of two important agricultural investigations, the first appearing in 1866 in ten volumes, the second in 1879 in two volumes. The Forestry Commission, annexed to this ministry, published in 1878 a *Statistique forestière*, with atlas.

Ministry of Justice.

The Ministry of Justice publishes its statistics in two chief collections: —

Le compte général de la justice criminelle.
Le compte général de la justice civile et commerciale.

The former is a detailed statement of the labors of the criminal courts, the latter of the labors of the courts of appeal, of the various civil and commercial tribunals, councils of arbitration, etc.

Ministry of Posts and Telegraphs.

This ministry publishes: —

Statistique sur le mouvement des correspondances postales.
Bulletin. (Monthly.)
Rapport sur les opérations de la caisse nationale d'épargne.

Postal statistics are also inserted in the —

Annuaire statistique de la France.
Annales du commerce extérieur.
Statistique générale de l'Algérie.
Annuaire statistique de la ville de Paris.

Ministry of Foreign Affairs.

The Ministry of Foreign Affairs publishes no statistics. It receives the reports of consuls and transmits them to the Ministry of Commerce, which publishes them at length or in extracts in the *Annales du commerce extérieur* and in the Consular Bulletin.

City of Paris.

The city of Paris issues some very valuable statistical publications. The *Recherches statistiques sur la ville de Paris et le département de la Seine* is a very important collection of statistics in six volumes, covering the period 1816–56. From 1856–64 the statistical documents of Paris were not published, or, at most only partially, as in the Statistical Annual of 1880. The *Bulletin de statistique municipale de la ville de Paris* is a monthly publication which appeared from 1865–79. Since 1879 two new series of statistics have appeared,—

Annuaire statistique de la ville de Paris.
Bulletin hebdomodaire de statistique.

The former contains varied information interesting to the administrator, the economist, and the doctor. The weekly Bulletin is intended to give immediate publicity to all the information which the public needs to have without delay. Statistics interesting the economist, such as the business of the markets, the condition of savings banks, city hospitals, charitable institutions, etc., are published in a —

Tableau mensuel de statistique municipale de la ville de Paris.

Another city publication of importance is —

Résultats statistiques du dénombrement pour la ville de Paris et renseignments relatifs aux recensements antérieurs.

Almost all the chief departments of the municipal administration publish volumes entitled *Budget et compte*, which contain much statistical information.

Nearly all of the 86 departments publish annuals. A certain number of cities publish weekly journals containing sanitary and meteorological statistics. Such are Amiens, Toulouse, Bordeaux, Marseilles, Toulon, Nantes, Nice, Nancy, Rheims, Le Havre, etc. Le Havre, Nancy, and Rheims also publish very complete and valuable annuals.

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SKETCH OF THE LIFE OF ROBERT W. WOOD, M.D.

By John Ward Dean, A.M.

Presented to the Association at its Annual Meeting, Feb. 10, 1893.

Robert Williams Wood, an officer and benefactor of the American Statistical Association, died at his residence in Jamaica Plain, Boston, Mass., on the 4th day of January, 1892, in the eighty-ninth year of his age. He was the second son of Capt. Joseph and Mrs. Betsey (Williams) Wood, of Stow, Mass., where he was born April 22, 1803. In 1808, when he was about six years old, the family removed to Augusta, Maine. Here Robert received his early education at the public schools. His father inherited a moderate fortune, but was unfortunate and lost it, so that Robert from an early age was forced to depend upon his own exertions for his support. When he first conceived the idea of obtaining an education he asked his mother's advice. She told him she could not advise him in this matter. Others had obtained an education under similar circumstances, and if he dare venture she advised him to undertake it. He did venture, prepared himself for college, and entered Waterville College, now Colby University. While pursuing his studies here he taught a district school to obtain money to pay his expenses. He was graduated in 1829, and left college little in debt.

After graduating at Waterville he began the study of medicine at Augusta, Me., under the instruction of Dr. Cyrus Briggs of that town. He then attended three courses of lectures at the Medical School of Maine connected with Bowdoin College, Brunswick. Subsequently he went to Boston, Mass., and attended medical lectures there. In 1832 he completed his studies and received the degree of M.D. from Bowdoin College.

He took him a wife from a family in good standing in Machias, where he had taught school while in college. He began the practice of medicine at Aurora, Me., and was successful in his profession. The next year a physician was wanted in Orono in the same state in the vicinity of Bangor. Dr. Wood removed there and established a good practice. Here he resided till 1838, when he sailed for the Hawaiian Islands. His sister, Charlotte Augusta, wife of William Coffin Little, had preceded him, and the accounts she gave of the delightful climate

induced him to try his fortunes there. He sailed from Boston on the 20th of October, 1838, and arrived at Honolulu on the 6th of April in the following year. He resumed immediately the practice of his profession. By appointment of the United States Consul, he was for ten years, from 1839 to 1849, physician of the hospital for American seamen at Honolulu. Having a mortgage on a sugar estate in the Island of Kauai, which had not been successful, he was obliged to give his personal attention to it, in order to save his property. For the purpose of becoming acquainted with the best mode of sugar raising, he made a visit to the plantations of Louisiana. For twenty years he was engaged in raising sugar-cane and the manufacture of sugar, in which he was a pioneer. He was the first person that was financially successful in the introduction of this industry into the Hawaiian Islands. He afterwards bought another estate on the island of Maui, and carried on both of the plantations till after his return to the United States in 1866. He withdrew from this business soon after, and from all business a few years later.

From 1872 till his death he resided at Jamaica Plain. The same year that he took up his residence here, 1872, he was elected a fellow of the American Statistical Association, of which his wife's uncle, Edward Jarvis, M.D., had been for many years president. He took much interest in the institution, and in 1873 he was chosen librarian, which office he held till 1883, when he was succeeded by Davis R. Dewey, Ph.D., the present librarian and secretary of the Association. He was counsellor from 1889 to 1890; a member of the publication committee from 1883 to 1888; and of the library committee from 1878 to 1887. He was also a member of the Hawaiian Club of Boston. This club, at its annual meeting, held on the 27th day of January, a few weeks after his death, appointed a committee, of which the Hon. James W. Austin, who was acquainted with Dr. Wood in Honolulu, was chairman, to convey to the family their sense of the loss they had sustained by his death. In their communication they say: "He was one of our original members, and one of our most valued associates. His presence was always most welcome at our meetings. He endeavored to advance the interests of the club, and to promote its prosperity. We recognize his many estimable qualities as a man, and his faithfulness and loyalty as a friend. In the fulness of years he has left us after a life well spent in good and faithful service."

Dr. Wood married on the 4th of June, 1833, Delia, daughter of Samuel A. Morse, of Madison, Maine, for many years Collector of the United States Customs for the port of Machias, Maine, and afterwards at Eastport, in the same state. He married, secondly, on the 31st of October, 1864, Lucy Jane, daughter of Charles W. Davis, of Concord, Mass., by whom he had one son, Robert Williams Wood, Jr., born May 2, 1868. His widow is still living at Jamaica Plain, Mass., and his son is a graduate student and Honorary Fellow at the University of Chicago.

During his lifetime he was a liberal donor to the American Statistical Association. Other societies were also partakers of his wealth. At his death this Association received a bequest of three thousand dollars. Seventeen other educational, religious, charitable, and scientific institutions were remembered in his will, the aggregate amount of his public bequests being seventy thousand dollars.

He lived to a ripe old age, but was blessed with health and mental vigor in a remarkable degree. The death, even at an advanced age, of such a man, whose sterling integrity, good sense, and practical knowledge of affairs fitted him so well to be a useful member of society, and whose kindness of heart made him always a ready helper of his fellow-men, may be regarded as a loss to the community as well as to his relatives and friends. By this society his loss is especially felt. He was always ready to perform the duty assigned him, and to work unselfishly for the welfare of the Association.

In 1885 Dr. Wood prepared for the Statistical Association a Memorial of Edward Jarvis, M.D., who died October 31, 1884, at the age of eighty-one, and who had held the office of president of the Association for upwards of thirty years. The paper was read at the annual meeting, January 16, 1885, and was printed as an octavo pamphlet of 21 pages. Dr. Wood was also a contributor to various periodicals.

REVIEWS AND NOTICES.

EARNINGS OF WOMEN IN MICHIGAN.

Ninth Annual Report of the Bureau of Labor and Industrial Statistics. Henry A. Robinson, Commissioner of Labor. 1892. Lansing, Michigan. Pp. xvii, 472.

The last annual Report of the Michigan Bureau of Labor is a presentation of the condition of the wage earning women of the state, the amount of mortgages, and the number of property owners in the city of Detroit, together with miscellaneous statistics concerning strikes, criminal records, etc. The most important part of the Report is that treating of women wage earners, and is the only one here considered. It is the first time an exhaustive investigation of this subject has been made in Michigan, and for this reason, if for no other, the Report is worthy of consideration.

Fourteen manufacturing cities and towns in the state were visited, and information was secured concerning women in 137 industries. 129 questions were asked, classed as social, industrial, economic, and sanitary, while others related to hours of labor, dress, church attendance, and membership in societies. Thus a mass of interesting material has been collected in regard to the conditions under which women work, and it is in this that the real value of the Report consists, and not in the discussion of wages.

It is a matter of no small moment to stimulate among working women themselves a discussion concerning the sanitary conditions under which they work, the unhygienic features of women's dress, the possibility of saving wages, the value of organization, and the importance to themselves of statistical investigations of their work. The education of employers and employes is a legitimate, if not an expressed, object of a bureau of labor.

The results obtained in Michigan do not differ materially in fundamental principles from the results of similar investigations elsewhere. They show that women are underpaid and apparently paid less for the same work than are men; that they are able to save but little;

that hours of labor vary greatly in different industries, but that in similar industries the differences are not great; that the entrance of women into the industrial field has not only not impaired their health, but has even resulted in a positive gain to it in spite of the unsanitary conditions too often found,— the tables showing a marked improvement in health on the part of a majority of women since beginning work; that the majority of the wage earning women are of foreign birth or parentage; that child labor is not uncommon in spite of legal restrictions, or work prolonged to extreme old age; that the majority of workers are between 15 and 25 years of age, and have begun work between the ages of 14 and 18; that 83 per cent of women in the state work under home influences,— results similar to that obtained by the United States Commissioner of Labor in 1888, when it was found that 85.5 per cent of women in the cities investigated lived at home; that little organization exists among working women, and that as a class they are suspicious and unwilling to answer questions concerning their work.

Extreme care has apparently been taken to have the results obtained presented faithfully and accurately.

The Report must be criticised unfavorably in three particulars,— two of them incident to the recent entrance of women into the industrial field. First, it may at least be questioned whether any temporary or permanent advantage is gained by thus separating the work of women from that of general wage earners in the same industries. Women in manufacturing industries work side by side with men, and all questions concerning wages, hours of labor, sanitary conditions, apply as much to one class of workers as to the other. The one thing that will most help women as wage earners is to have their work and its financial results measured by the standards applied to other workers longer in the same fields. Second, the classification employed seems defective and irrational. An average wage is meaningless when it includes the wages paid (*a*) domestic servants, who receive personal expenses plus cash wages; (*b*) library cataloguers, whose work is largely technical; (*c*) companions, whose chief qualification is agreeableness; (*d*) music teachers, who require special natural endowments in addition to technical training; (*e*) proof readers, whose work is a special trade; (*f*) janitresses, whose qualifications are physical; and (*g*) cash girls, too immature to do any other work. If

to these be added occupations as varied in the qualifications demanded as are stenography, hair dressing, millinery, laundering, and the different forms of work in mills, factories, stores, and offices, it will be seen of how little value is the average result. An appreciation of this principle is seen in the exclusion from the average wage of the wages received by teachers and state employes, but its application should have been carried much farther. If a general average had been given of the wages received by persons engaged in production, distribution, personal service, etc., it would have seemed more reasonable. A general wage average is sometimes interesting when it includes the wages in the different departments of an industry where promotion is possible, but it is meaningless when it includes the wages paid skilled and unskilled labor in different industries where no possibility exists of passing from one industry to another.

The same defect is seen in the average hours of labor. In the general average are included the hours of (*a*) factory laborers, regulated by law; (*b*) employes in stores and offices, fixed by custom; (*c*) domestics, subject to the caprices of employers; (*d*) music teachers, florists, and mistresses of boarding houses, presumably optional.

Third, inasmuch as the general public has yet to be educated to consider statistical reports interesting and valuable reading, the presentation of statistical material in a clear, dignified, and fairly interesting manner is scarcely second in importance to that of securing reliable facts, collating them accurately, and interpreting them judicially. The majority of readers whose interest in statistics has yet to be won are repelled by the frequent use of "bulking," "totaled," "data" used uniformly as a singular noun, the not infrequent use of a plural subject with a singular verb and the reverse, "widow lady," such phrases as "the canvassers received different answers than, etc.," "every wage earner will be glad to answer full and free," and a score of inaccurate expressions too long to quote.

But far worse than this slovenly use of English — bad as it is — is its undignified use. "Grass widow" (p. 133), "gents" (p. 108), "a hustling city" (p. 183), savor of the street corner rather than suggest the highest industrial authority in a great commonwealth. Even if these can be excused on the score of haste, no apology seems possible for the use, page after page, of "fore-lady," "sales-lady," "reception-lady," "cloak-lady," and "fore-lady of the washroom";

nor for the statement that "lady canvassers went to the women wage earners in person" (p. 19).

Accuracy of mathematical work and grasp of statistical principles ought not to be incompatible with the presentation of a subject, if not in elegant, at least in not slovenly English.

LUCY M. SALMON.

Vassar College.

EFFECT OF OCCUPATION ON HEALTH.

The Effect of Occupation on the Health and Duration of the Trade-life of Workmen. 12th, 13th, and 14th Annual Reports of the Bureau of Statistics of Labor and Industries, of New Jersey, 1889, 1890, and 1891. Trenton, N. J.

Statistics intended to show the effect of occupation upon mortality are, as a rule, the most unsatisfactory of all statistics, in consequence of the many sources of possible error which affect them. Different methods have been employed for the purpose of ascertaining the effect of occupation on mortality; (1) The mean age at death. a method which is always open to objection in consequence of the fact that the mean age at death is governed largely by the mean age of the living, and may be affected both by the age at which people enter and leave any given occupation, and by the increase or decrease of employment. Instances also are on record in which all the older employes of a large establishment are discharged, to give place to young persons from 15 to 25 years of age. The mean age at death in such instances would be lowered. (2) The ratio of the number dying in any given occupation compared with the number employed in the same. This mode must be fallacious for the same reasons as the former. (3) The best method is to compare the mortality of those engaged in one occupation, and of a given age, with the mortality of those engaged in another occupation, and of a corresponding age. (Newsholme.)

The difficulty of obtaining these data with accuracy has proved a serious obstacle in arriving at conclusions upon this point in the United States. Another source of error in this country is the greater want of permanency or stability of employes. People in New England, for example, often change their occupations at different periods of life. Many men, after acquiring a competency, retire to small farms

and die as agriculturists, thus increasing the mean age at death of this class, and diminishing that of the class which they have left. In Europe, on the contrary, occupations are far more permanent, and are more often transmitted from father to son for many generations.

It is with pleasure that we turn to an honest attempt at certain inquiries in America relative to the effect of occupations upon the life of workmen. The Reports of the Bureau of Statistics of Labor of New Jersey, for the years 1889, 1890, and 1891, contain a valuable series of statistics upon this subject, the object in view being to ascertain the "duration of the active trade or working-life of workmen."

The value of this inquiry may be summed up in the words of the compiler. "This phase of the question heretofore has received little attention, but is one of immense moment to the wage-worker, who, if still alive, will sooner or later find himself unable to continue at work in competition with younger men. Perhaps of not more that 40 or 50 years of age, and still in comparative good health, with an expectation of life of from 20 to 25 years, he is, by reason of some slight physical impairment, unfitted to follow a trade in which he has spent the best of his early days to become efficient."

The Bureau decided to seek for information showing the age at which a workman began to work at his trade, his present age, the age at which he began to decline, that is, grow less active, or become incapacitated, and the total number of years actually at work, as a basis for a correct estimate of the duration of his trade life. The information was obtained by means of blank forms addressed personally to each workman, and placed in the hands of competent agents.

The entire number of workmen included in the statistics of the three years was nearly 13,000, and the occupations represented were the following: carpenters, painters, bricklayers and masons, stone-cutters, plumbers, printers, glass-blowers and glass-workers, hatters, miners, and workers in potteries. The glass-workers, hatters, and potters were classified into several sub-groups. The average *present age* (age at time of taking the statistics) of the workmen varied from 28.5, 29.3, 30.5, 30.5, and 31.2 years, respectively, in pot-handlers, pot-decorators, pot-packers, pot-pressers and printers, up to 42.2, 42.4, 42.6, and 42.7 years, respectively, in pot-throwers, window-glass flatteners, shearers, and glass-pot makers. The average *number of years at work* varied from 12.5, 12.7, 13.4, 14.1, and 14.2 years, respectively,

in pot-packers, glass-shearers, pot-decorators, window-glass blowers, and stopper-grinders; up to 19, 21.6, 21.8, and 29.3 years, respectively, in stone-cutters, pot-mould makers, pot-dippers, and pot-throwers. (The last figure has but little significance, since it is made up by three individuals only.)

The percentage of those beginning to decline was greatest in glass-pot makers, green-bottle makers, and flint-glass blowers (57.3, 35.4, and 29.4 per cent); and least in stone-cutters, glass-stopper grinders, pot-throwers, and pot-packers, where there were no representatives.

The highest per cent of American born workmen was among those of the glass-making groups (100 in each), and the lowest (16.5, 23, 34, and 34 per cent) among stone-cutters and three of the groups of potters. The largest groups of individuals contributing to the returns were carpenters, 2732; miners, 1269; hat finishers, 1257; hat-makers, 1247; painters, 1235; bricklayers and masons, 1022; stone-cutters, 701; and plumbers, 661.

The most common causes of decline reported among carpenters were rheumatism, loss of energy, general debility, accidents (falls from scaffolding and broken limbs), and failing eyesight; among painters painters' colic (greatly in excess of all other causes), loss of energy, rheumatism, constipation, lead-poisoning, and accidents; among bricklayers and masons, rheumatism, stiffness of joints, loss of energy, and accidents; among plumbers, malaria, rheumatism, typhoid fever, lung disease, and lead and blood poisoning; among printers, failure of eyesight, lung disease, general debility, and nervousness.

The Report states that "these data are fairly representative of the whole, embracing a very considerable proportion of the workmen in the respective occupations living within the territory covered, and accessible at the time of the enumeration. As a rule, this had to be done by a house-to-house canvass during the early hours of the evening, for not only do employers not take kindly to the interruption of their workmen, but most of those engaged in the pursuits mentioned, those of the building trades, work in isolated gangs, and are not to be reached even during the work hours."

The Bureau is to be congratulated upon the success of this comparatively unique inquiry, and we trust that it will be continued in the future.

S. W. Abbott.

INFLUENCE OF OCCUPATIONS UPON MORTALITY.

Journal de la Société de Statistique de Paris. October and November, 1892.

The general effect of vocation upon health has been studied scientifically but twice in France; the first time by Gustave Hubbard, in 1852, and the second recently by Dr. Bertillon, the chief of the statistical bureau of Paris, who has tabulated the returns of several mutual aid societies among the Lyons silk operatives. The special importance of this paper, *De la morbidité et de la mortalité par profession*, by Dr. Jacques Bertillon, attaches to the mortality statistics, the definition of sickness by the various aid societies which furnished the figures of morbidity being too various and conflicting to serve as a basis for generalization; nevertheless, a few conclusions as to relative morbidity, which the author draws, are interesting. It appears that women from 20 to 25 years of age, in the Austrian societies, lose considerably more time from sickness than the men of the same age, but after 45 years the losses are more nearly equal. Among the silk workers of Lyons both the morbidity and mortality of women exceed that of men, although this is not in general true of the whole population; and the Italian societies furnish results which bear out the same conclusions. Yet the general mortality of the women, without regard to age, is less than that of the men, although the mortality at each age is greater. This apparent contradiction is due to the fact that 42 per cent of the women are under 40 years of age, while but 20 per cent of the men are below this age. Among the Lyons operatives (1872–89) the average number of days lost from illness annually among the women was 9.390; among men, 7.810; but the average mortality among the men was 23.4 per 1000, while that of the women was only 17.6. In various Italian societies, whose records are compared in this way, the women lost 8.5 days in the year from illness, while the men were incapacitated but 6.6 days; but here, as before, the mortality for men was higher, being 11.7 pro mille, as against 10.7 for the women.

The general results of the investigations, as to the effect of age upon the mortality rates, are contained in the following table: —

Ages.	English Tables.				French Tables.		Italian Table.
	Friendly Society. (Masc.) Finlaison.	Manchester Unity of Odd Fellows. (Masc.) Henry Ratcliffe.			Mutual Society. Hubbard.	Silk Workers of Lyons. (Masc.) Bertillon.	Mutual Society. (Masc.) Bodio.
	1846-50.	1846-48.	1856-60.	1866-70.	1835-49.	1872-89.	1881-85.
20-25	7.48	7.40	7.58	6.43	8.5	13.0	6.3
25-30	7.29	7.90	7.48	7.62	7.5	5.4	5.9
30-35	7.96	8.70	8.34	8.18	9.5	6.4	6.2
35-40	8.93	9.16	9.91	9.77	8.2	6.4	7.8
40-45	11.00	11.65	11.78	12.58	8.9	10.2	9.2
45-50	13.06	13.99	14.21	14.29	15.5	11.8	11.6
50-55	16.36	18.61	17.95	19.05	16.3	20.2	14.9
55-60	23.60	28.67	26.09	24.92	20.3	19.5	22.2
60-65	28.55	41.14	35.66	35.37	29.9	40.7	32.5
65-70	43.91	57.21	54.99	52.09	54.3	67.0	50.4
70-75	62.03	70.42	68.25	78.11	134.3	88.0	73.6
All Ages	12.57	9.75	11.89	12.63	14.2	23.5	11.7

There is also a valuable series of diagrams, showing graphically the mortality, by occupations and ages, in Paris, England, and Switzerland, which illustrate the general conclusions which the author draws in the succeeding portions of the paper.

The occupations grouped according to general healthfulness, beginning with those which are least favorable to longevity, are: (1) professions involving exposure to the inclemencies of the weather without physical activity, as coachmen, cab-drivers, and carters; (2) professions exposing the individual to dust in the open air, including stone cutters, quarrymen, etc.; masons, slaters, and the like, have a death rate but slightly lower than these; (3) occupations with exposure to hard or metallic dusts in a confined space have as high an average mortality as the preceding class, no matter what the nature of the dust may be, as needle-makers, cutlers, file-grinders, potters, brush makers, etc.; (4) vocations exposing the artisan to soft or organic dusts, including millers, bakers, chimney-sweepers, etc.; (5) occupations carried on in heated, smokey, or vaporous atmospheres. Blacksmiths are a healthy class in Paris, though less so in England, and least so in Switzerland. Mechanics have an average rate of mortality; bakers a little higher, owing to the dusts; while glass-cutters are

seriously affected by the powder which is inhaled. Next in order come (6) occupations involving possible poisoning, as artists, potters, painters, plumbers, employes in chemical works, especially where mercury is present; tobacconists are included here, as well as those who are liable to contact with tainted or decaying substances, as tanners and butchers. The mortality in this group is generally considerable. (7) Groups of occupations with temptations to indulge in intoxicants, as wine merchants and hotel keepers. English brewers as a class have a lower death rate. (8) The class exposed to accidents of various kinds, as fishermen, quarrymen, and the like, whose mortality rate is also increased to considerations of other sorts, as in class (2). (9) Sedentary occupations cause a high rate of mortality, especially if they be carried on in impure air. A process of natural selection seems also to be at work here, as this class is generally recruited from the less vigorous portions of the population. The rate here is less than that of fruiterers and grocers, while fish dealers and haberdashers have an average mortality. Tailors have a high death rate, somewhat above that of engravers, watchmakers, and cobblers. The tenth class includes the so-called professions where the vitality is high, largely owing to the leisure which generally accompanies such a life. Priests, judges, and public functionaries have the lowest death rate of all in this group; and lawyers, architects, and engineers have a mortality below the average for the class. Physicians have a rate even lower than lawyers, expecially in Paris. (10) Most conducive to longevity are those occupations which, like the first class, necessitate exposure to the weather, but which, unlike it, require considerable bodily activity, as market gardeners, florists, and watermen.

On the whole, then, these results bear out the conclusions arrived at by Professor Westergaard, in his studies of the English population. The more recent investigations of Dr. Ogle, which will soon be published, are also confirmed. To be sure, in these studies, the clergy is marked as the most healthy class of the population, their death rate being but 66 per cent of the average for 62 chosen occupations, according to Westergaard. And in Dr. Ogle's tables the mortality for the next higher class, the gardeners, is 8 per cent greater. Yet the clergy is a picked class in England, which has no counterpart in France. The conditions there are so widely different as to vitiate any

comparisons. In regard to the healthiest occupation cited by Dr. Bertillon, a curious result appears, that, while the position of small farmers is so enviable in England and Switzerland, the same class in Italy loses more days from sickness annually than the industrial population. This result is confirmed in the two distinct periods considered. In Switzerland, as in England, consumption is the most prevalent disease, and the rate of mortality due to it, among farmers, is twice as high as the average for the whole population.

This valuable paper concludes with eleven extended tables, which have been computed for the mortality by vocations in Paris, England and Wales, Switzerland, and the Italian and Austrian mutual aid societies. They indicate clearly the average number of days lost from sickness yearly, together with the cause of death when it occurs. The tables themselves should be very valuable to the actuary; but they are also of general interest to the statistician, and form a basis from which the further investigation of the subject can be readily continued.

WILLIAM Z. RIPLEY.

FERTILITY OF MARRIAGES IN PRUSSIA ACCORDING TO THE RELIGIOUS CREEDS OF THE CONTRACTING PARTIES.

The *Zeitschrift des Königlich Preussischen Statistischen Bureaus* for 1891 contains a very interesting article upon the fertility of marriages in the different religious sects of Prussia for sixteen years (*Eheliche Fruchtbarkeit bei den verschiedenen Religionsgemeinschaften in Preussen, 1875 bis 1890*).

Since 1875 the Royal Statistical Bureau has kept a valuable record of marriages and births, together with the religious beliefs of the contracting parties, as well as their social positions. The figures are vouched for, and the records of the Bureau thus furnish a basis for reckoning the average fertility of all marriages according to creeds, callings, and social groupings.

The following table is a summary of all the tables which are given in the above article. The Evangelical creed is the established religion of Prussia. The group "other Christian" includes all Christian creeds except the Evangelical and the Catholic.

MARRIAGES AND LEGITIMATE BIRTHS IN PRUSSIA, ACCORDING TO RELIGIOUS CREEDS. 1875–1890, 16 Years.

Creed of Father.	A. Mother, Evangelical.					B. Mother, Catholic.				
	1. Total Number of Marriages.	2. Total Number of Births.	3. Average Number of Births per Marriage.	4. Number of Still-Births.	5. Still-Births per 100 Births.	1. Total Number of Marriages.	2. Total Number of Births.	3. Average Number of Births per Marriage.	4. Number of Still-Births.	5. Still-Births per 100 Births.
Evangelical....	2,214,303	9,631,416	4.35	389,639	4.05	118,772	391,538	3.30	12,947	3.31
Catholic.....	139,342	465,734	3.34	15,752	3.38	1,046,903	5,484,658	5.24	195,085	3.56
Other Christian	2,481	6,640	2.68	210	3.16	294	912	3.10	33	3.62
Jewish.....	1,763	2,794	1.58	93	3.33	308	426	1.38	11	2.58

Creed of Father.	C. Mother, Other Christian.					D. Mother, Jewish.				
	1. Total Number of Marriages.	2. Total Number of Births.	3. Average Number of Births per Marriage.	4. Number of Still-Births.	5. Still-Births per 100 Births.	1. Total Number of Marriages.	2. Total Number of Births.	3. Average Number of Births per Marriage.	4. Number of Still-Births.	5. Still-Births per 100 Births.
Evangelical....	1,814	2,956	1.63	84	2.84	1,578	2,809	1.78	96	3.42
Catholic.....	253	555	2.19	25	4.50	458	761	1.66	31	4.07
Other Christian	4,074	29,406	7.22	970	3.30	77	496	6.44	33	6.65
Jewish.....	30	242	8.07	9	3.72	38,264	160,935	4.21	5,288	3.29

Men naturally seek wives of the same creed. But this rule is by no means general, and there are many exceptions, especially among those men holding creeds which include but a small portion of the population of the state or district in which they live. From the tables in the above article we have the following, based upon the records of the 16 years: —

Of the	2,336,467	Evangelical men,	94.77	per cent married	Evangelical	women.
" "	1,186,956	Catholic "	88.20	" "	Catholic	"
" "	6,926	other Christian men,	58.82	" "	other Christian	women.
" "	40,365	Jewish "	94.79	" "	Jewish	"

Since the Jewish population is only 1.25 per cent of the entire population, these figures show that Jews in their choice of wives are more consistent than any other religious sect,— a further proof of the firm bonds of the Jewish race.

The following figures show to what extent the Jews and Christians intermarry: —

Of the Jewish men, ...	5.21	per cent	marry	Christian	women.
" " Evangelical men, . .	only 0.07	"	"	"	Jewish	"
" " Catholic men, ...	only 0.04	"	"	"	"	"
" " "Other Christian" men,	only 1.11	"	"	"	"	"
" " Jewish women, ...	5.23	"	"	"	Christian	men.
" " Evangelical women, . . .	0.07	"	"	"	Jewish	"
" " Catholic women, ...	0.03	"	"	"	"	"
" " "Other Christian" women,	0.49	"	"	"	"	"

The relatively high number of marriages between "Other Christians" and Jewish persons, as well as the extraordinary low percentage of marriages between themselves, may be explained by the several miscellaneous creeds which are grouped together as "Other Christian." It includes, for example, on the one hand, the Apostolic church (Irvingites), Baptists, Mennonites, Anglicans, Presbyterians, Methodists, and Quakers; and, on the other hand, Dissenters, Free Religious Creeds, and Mormons. In the first group men and women would be as apt to marry members of their own creed as are the Evangelists, but the creeds in the second group are characterized by no strict matrimonial laws, hence marriages with persons of other creeds are more frequent. Again, many of these other Christians are Christian Jews who would not hesitate to marry members of their own race. This fact may explain the relatively large number of marriages between "Other Christians" and Jews, and also it may explain the relatively high rate of fertility accompanying such marriages.

Now while the fertility of marriages between people of the same creed is relatively high, we have, on the other hand, a low percentage of births where the parents are of different creeds. For example, we see from the above table that the average number of births per marriage in which both parties have the same creed varies from 5.24 to 3.30 for unions between Catholics and Evangelists. But in cases of unions where there are —

Evangelical men and Jewish women,	there are only	1.78	births	per	marriage.
Catholic men and Jewish women,	" " "	1.66	"	"	"
Jewish men and Evangelical women,	" " "	1.58	"	"	"
Jewish men and Catholic women,	" " "	1.38	"	"	"

It thus appears that it makes but little difference in fertility whether the man or woman in a mixed union belongs to the Jewish race. The number of children per average marriage varies from 1.78 to 1.38, and a population of Christian-Jewish couples would soon die out.

But in the case of unions between Jews and "Other Christians" the fertility is very marked. Thus, with men belonging to "Other Christian" creeds, the fertility of marriages with Jewish wives is 6.44 births per union, and with Jewish men in union with "Other Christian" wives this average is 8.07 children.

The article also compares the different religious creeds according to still-births, as shown in columns 4 and 5 of the table. From this table we see that the number of still-births is greatest in cases where both parents are Evangelical (4.05 per cent). The other creeds are then arranged in order, as follows: —

1. Both parents Evangelical, ...	percentage	of	still-births,	4.05
2. Both parents Catholic, ...	"	"	"	3.56
3. Catholic father, Evangelic mother, . . .	"	"	"	3.38
4. Evangelic father, Catholic mother, ...	"	"	"	3.31
5. Both parents "Other Christian,"	"	"	"	3.30
6. Both parents Jewish, ...	"	"	"	3.29
7. "Other Christian" father, Evangelic mother,	"	"	"	3.16

The variations here may be due in some cases to the lack of registration of premature births, etc. among the poorer classes, as, for example, in the eastern provinces, where the Catholics are chiefly of Polish descent. This may also explain the variation in 3 and 4 above.

The article reviewed above lacks two important considerations, which seem to me quite necessary before we can judge of the relative marriage fertility of different creeds. These are the social status and the nationality of the parties concerned. A man's creed depends largely upon his intellectual status in society, and the fertility of marriage unions upon the degree of intelligence of the contracting parties, hence comparisons of creeds relative to marriage fertility should be made only between equal grades of society. Then, again, different races vary greatly in fecundity, and the nationality of the contracting parties, as well as in their religious beliefs, should be considered.

A further criticism might be made upon the manner in which averages derived from great numbers of cases are compared with averages derived from few cases. Compare, for example, in Table I, section C, column 1, with section A, column 1. Here the average derived from thirty cases is compared with that derived from more than two millions of cases.

GARY N. CALKINS.

THE FRENCH POPULATION.

Journal de la Société de Statistique de Paris. September, 1892. *La population française.* Par M. Levasseur.

The population of France is nearly stationary, yet almost every census since 1800 has shown an absolute increase in the number of people. The only exceptions to this rule have been the year 1853–54, when both war and the cholera united to check the natural growth; 1870, again, was a time of war, and in 1890 (probably also in 1892) there was a negative result shown by the enumeration. The naturally slow growth has been accentuated during the last fifteen years, so that today all of the problems presented by a stationary population are especially pressing and urgent. One of the most important of these is that of the relative increase of wealth and population, and in this regard France is especially fortunate, comparing favorably with the rest of Europe. The political problem now is concerned rather with the absolute increase in numbers. France possessed 21 per cent of the population of the five great European powers in 1816, while in 1890 she constituted only 13 per cent of the aggregate population of the six most important nations. This the author considers the burning question of the time for all patriotic Frenchmen, as in the present armed state of Europe it may affect the autonomy or independence of the nation.

From 1801 to 1810 the rate of mortality was 28.2 per 1000; from 1881–88 it fell to 22.2; whereas, the average for Europe is now 28, and of twenty-nine states there are but nine which have a lower rate than France. In reality the improvement in general vitality is not as great as the figures indicate, for it is the birth rate which has decreased the most, which in itself means a larger proportion of adults, and consequently a lower death rate, irrespective of all other considerations. Nevertheless, there has been considerable improvement due to greater civilization, spite of this necessary correction. The marriage rate from 1881 to 1888, 7.4 per 1000, is somewhat below the average for Europe (8.4 per 1000 from 1865 to 1883). It has fallen since 1880, partially as a result of the great mortality in the wars of 1870, among men who would still be within the ages of probable marriage,

especially among the thrifty peasantry. Yet, since the same results are observed in other states not depopulated by war, it is more likely due to longer army service for men of a marriageable age.

The great weakness of France is the low birth rate. This has fallen during this century from 32.2 per 1000, in 1801–10, to 24 in 1881–88, although the decrease has been less rapid since 1850. With a rate of 25 per 1000 in 1865–83, France stood last among European nations, the average of which was 38.5. Its marriage rate was more normal, as France stood 18th in a total of 29 nations. Since 1886 the number of births has fallen below 900,000, and, owing to the epidemic of influenza in 1890, was even less than the number of deaths. This feeble birth rate is largely responsible for the low death rate, of course, and it is merely an exaggeration of a phenomena common to all the states of Europe. Since 1872 its population, considering the excess of births over deaths, has gained on the average but 3.4 per 1000 yearly, while that of Europe has grown at the rate of 11 per 1000, and the German Empire at a rate of 11.6 per 1000. The annual surplus for the last ten years has not been above 2.9 per 1000 as in 1881, and the average has been but 1.7, so that the least disturbance of normal conditions may change it into a deficit, as in 1890. Illegitimacy is not very great, being but 7.5 per 1000 births, though it has risen in single years to 8. This is rather from a decrease in legitimate births, however, than from increase in the absolute number of illegitimate ones.

The low birth rate and the rapid increase of wealth offer great inducements to immigration; and the population of France includes a larger proportion of foreigners than any other great European power. The same reasons conspire to prevent excessive emigration, the number being only 20,000 to 30,000 a year. Within the nation there is a great immigration of the rural population into the cities. This movement is really less marked than in the United States, but the general increase of population there is so slow that it does not counterbalance the decrease in the country districts. As a result, 41 departments had a smaller population in 1886 than in 1846, and the last two censuses (1886 and 1891) show a positive decrease in 51 departments against an increase in but 32. This is brought out in a succeeding article by M. Leon Roquet.

The distinguished author is of the opinion that it is useless to look

for any change in these various tendencies at present; they are, indeed, more likely to become accentuated. The hope of France for the future is in hygienic regulations, morality, and education, which will tend to reduce the rate of mortality, that thereby the present deficit may become converted into a surplus.

Journal des Economistes. October, 1892. *La population française le dénombrement.* M. Leon Roquet.

This sketch deals with a tendency toward the concentration of population in large cities, which we have noted above in the statistics of M. Levasseur, but it brings the figures down to a later date, including the results of the census of 1891. In France there are 56 cities having over 30,000 inhabitants, among which 9 show an absolute decline in population since the last census. Nantes, Saint Nazaire, Calais, and Boulogne are among this number; Dunkirk shows a considerable falling off due to the tariff legislation. The 47 other cities show a total increase of 372,074 inhabitants, which is not due to excess of births over deaths, but to immigration from the rural communes. Indeed, the total increase of population shown by the last two censuses has been but 124,289. Paris alone has gained 103,407, which is more than the total population of some of the departments. The suburbs of Paris have absorbed many of the emigrants from the country; the department of the Seine, for instance, shows in four years and a half an increase of 180,000, a rate of increase exceeding 3000 per month.

The other principal cities have increased by the following amounts: Lyons, 36,147; Marseilles, 27,606; Bordeaux, 11,833; Montpellier, 12,493; Saint Etiene, 15,588; Nice, 10,795; Roubaux, 14,618; Lille, 12,939. The result of these various concentrations of population, exclusive of Paris, is that these lesser cities have drawn to themselves more than twice the total increase of the population of France since the last census. The great cities not only absorb the entire increase of population, but three or four times that number, so that the rural communes are being actually depopulated, as M. Levasseur has demonstrated in his great study of the subject.

W. Z. Ripley.

THE GEOGRAPHICAL DISTRIBUTION OF SEXES.

Karl Bücher has recently published in the *Allgemeines Statistische Archiv*, for 1891–92, Part II, a paper entitled *Ueber die Verteilung der beiden Geschlechter auf der Erde*, originally read before the *Verein für Geographie und Statistik zu Frankfurt a Main.*

This paper is of more or less popular value, and the conclusions are based almost entirely upon statistical facts derived from provinces in Germany rather than from the entire world. Bücher's main thesis is to show that sexes are not evenly distributed throughout the globe, and that there is in all places a tendency towards preponderance of one sex.

It is impossible to ascertain at present the exact proportion of men to women upon the earth's surface, because of the inexact returns, when there are any, from uncivilized countries. Still, whatever may be the inequality between members of both sexes in the world at large, we find upon limiting ourselves to certain portions of it, in which statistics are accurate, that there is a decided inequality.

Of the five great divisions of the earth Europe alone has a preponderance of females. In America, Asia, Africa, and Australia males are more or less in excess. The subdivisions of each of these continents show the same inequalities. Thus in Europe we find a preponderance of males in seven of twenty-eight states, and an excess of females in the remainder. In America, too, there is a difference between the west and the east of Canada and the United States. In these countries the west invariably has a preponderance of males, but the inequality becomes less and less in approaching the middle regions; and in the east women are in excess.

The table shows great variations in the proportion of men to women in different parts of the world. Up to the present time the excess of females has been considered as due to emigration or unnatural causes, but Bücher thinks that these causes do not fully account for the differences, and believes that there must be some deeper reason, although he does not tell us what it is.

Confining himself to portions of Europe where statistics are complete and reliable he gives many illustrations, showing that equality is never reached. In France, for example, a country which has been frequently taken to illustrate a tendency towards equal numbers of both sexes, he shows that the equality is only apparent. Here unnatural

causes furnish more men than women, and the natural inequality is thus balanced. The true result should be based on the relation of births and deaths, and this in France for the six years 1881–86 is as follows: —

	Male.	*Female.*	*Females to* 100 *Males.*
Births, ...	2,857,001	2,726,467	954
Deaths, ...	2,629,963	2,434,448	925
Excess, . .	227,038	292,019	1,286

In the cities of Germany we find a preponderance of women, but the standing armies so affect the registration that it is difficult to ascertain the true proportion of males to females at any particular place. Leaving the floating population out of consideration, and counting only those who were born and reared at the same place, we find in German cities 104 boys born for every 100 girls. These girls, however, have a better chance for longevity than do the boys, and to such an extent that between the ages of 20 and 30 years the numbers of the two sexes are about equal.

The preponderance of females over males in some of the European cities is shown by the following table: —

	Females to 1000 *Males.*		*Females to* 1000 *Males.*
Stockholm, ...	1,176	Antwerp, ...	1,057
Gothenburg, ...	1,176	Liege, ...	1,096
Hague, ...	1,204	Geneva, ...	1,191
Rotterdam, ...	1,202	Berne, ...	1,182
Amsterdam, ...	1,186	Copenhagen, ...	1,172
Bruges, ...	1,291	Paris, ...	1,050
Ghent, ...	1,146	Vienna, ...	1,124
Brussels, ...	1,144	Prague, ...	1,171

Bücher argues that, if this greater loss of boys were caused by emigration, accidents, and similar agents of removal, we must look for like causes in those countries where males predominate, as Italy, for example. This he considers improbable, and concludes from it that the tendency is towards inequality of distribution of the sexes.

Bücher's conclusions, however, do not prove much either way, and his illustrations should have included cities and countries more widely separated. If emigration and surroundings are not of much consequence in determining the proportion of men to women, newly settled lands should show no variation in this proportion from time to time, and, for the same people, no variation from that of the native countries. On the other hand, it is a well-known biological fact that environment has much to do with the question of sex.

The following table shows the relation between the sexes in various parts of the world: —

TABLE SHOWING THE GEOGRAPHICAL DISTRIBUTION OF SEXES. (Abridged.)

I. COUNTRIES OF EUROPE.	Year.	Date.	Male Population.	Female Population.	Females to 1000 Males.
Russia	1886	.....	42,499,324	42,895,885	1,009
Germany	1890	Dec. 1..	24,231,832	25,189,232	1,039
France	1886	May 30.	18,960,312	19,030,447	1,007
Great Britain and Ireland	1891	Apr. 5..	18,388,756	19,499,397	1,060
Italy	1881	Dec. 31.	14,265,383	14,194,245	995
Austria	1880	"	10,819,737	11,324,507	1,047
Spain (with Canary Islands)	1887	"	8,608,532	8,950,776	1,039
Hungary	1880	"	7,799,276	7,939,192	1,019
Poland	1886	.....	3,977,406	4,279,156	1,076
Belgium	1890	Dec. 31.	3,062,656	3,084,385	1,007
Sweden	1890	"	2,317,105	2,467,570	1,065
Portugal	1878	Jan. 1..	2,175,829	2,374,870	1,091
Roumania	1860	.....	2,276,558	2,148,403	944
Netherlands	1889	Dec. 31.	2,228,487	2,282,928	1,024
Bulgaria	1881	.....	1,519,953	1,462,996	962
Switzerland	1888	Dec. 1..	1,427,377	1,506,680	1,055
Finland	1889	Dec....	1,152,111	1,186,293	1,030
Greece	1889	.....	1,133,625	1,053,583	929
Denmark	1890	Feb. 1..	1,059,222	1,112,983	1,051
Servia	1890	Dec. 31.	1,110,731	1,052,028	947
Norway	1891	Jan. 1..	951,496	1,037,501	1,090
Bosnia and Herzegovina	1885	May 1..	705,025	631,066	895
Total for all of Europe	....	.....	170,818,561	174,914,119	1,024
II. AMERICAN COUNTRIES.					
United States	1880	June 1..	25,518,820	24,636,963	965
South America	....	.....	6,581,284	6,241,733	949
Mexico	1882	.....	5,072,054	5,375,920	1,060
British North America	1881	.....	2,288,196	2,229,735	974
Cent. America and West Indies	....	.....	2,170,430	2,042,535	941
Bermuda Islands	1890	.....	7,767	8,117	1,046
Greenland	1888	Dec....	4,838	5,383	1,112
Total for America	...	.....	41,643,389	40,540,386	973
III. COUNTRIES OF ASIA.					
British India	1891	.....	112,150,120	108,313,980	966
Tributary States	1891	.....	31,725,910	29,675,150	935
Japan	1888	.....	20,008,445	19,598.789	979
Russian Possessions	1885	.....	7,914,431	7,112,178	899
Total for Asia	....	.....	177,648,044	170,269,179	958
IV. COUNTRIES OF AFRICA.					
Egypt	1882	May....	3,401,498	3,415,767	1,004
Algeria	1886	.....	2.014,013	1,791,671	889
Total for Africa	....	.....	6,994,064	6,771,360	968
V. AUSTRALIA.	....	.....	2,197,799	1,871.821	852

GARY N. CALKINS.

EFFECT OF PARENTS' AGE ON VITALITY OF CHILDREN.

Josef Körösi has recently written an interesting article upon the *Effect of Parents' Age on the Vitality of Children* in the *Jahrbücher für Nationalökonomie und Statistik*, No. 4, 1892. It is based upon records kept by himself during the five years between 1878 and 1882, and during the years 1888 and 1889, making in all seven years, although not consecutive.

Körösi divides the causes of death among children under 10 years of age into two groups,— those caused during pregnancy, or uterine, and those which develop after the birth of the child, or extra-uterine. The same diseases were not studied during both periods, but in both periods constitutional delicacy, water on the brain, rachitis, and scrofula were recorded, whereas lung tuberculosis, inanition and atrophy, and premature still birth were recorded for the two-year period only.

His results show that the uterine diseases depend much more upon the age of the mother than the other class, and the article makes a strong argument against early marriages of women, but the age of the father does not seem to make much difference upon the vitality of the child. The strongest children, however, are those whose fathers are between 30 and 40 years of age, while the mortality of those born before the father has reached the age of 25 seems to correspond with that of the children whose mothers are under 20. These facts are shown by the following tables: —

EFFECT OF THE MOTHER'S AGE.

Age of Mother.	Uterine Diseases.		Intestinal Catarrh.
	Two-Year Period. (Including Tuberculosis.)	7 Years. (Excluding Tuberculosis.)	7 Years.
	Deaths.	*Deaths.*	*Cases.*
Under 20 years	37.32 per cent.	22.31 per cent.	26.29 per cent.
From 20 to 30 years	21.09 "	14.31 "	21.89 "
From 30 to 35 years	14.04 "	12.85 "	18.05 "
Above 35 years	15.35 "	13.45 "	19.25 "
Age of Father.			
Under 25 years	20.41 per cent.	14.57 per cent.	19.31 per cent.
From 25 to 30 years	18.17 "	14.13 "	22.02 "
From 30 to 40 years	17.05 "	12.92 "	20.03 "
From 40 to 50 years	21.46 "	16.02 "	21.10 "
Above 50 years	10.14 "	11.96 "	18.44 "

From the above table, if we take the mothers' ages from 20 to 30 as 100, we have —

		For 2 Years.	*For 7 Years.*		
Below 20 years,	Uterine diseases, 176		156	Intestinal catarrh, 120	
From 20 to 30 years,	" "	100	100	" "	100
" 30 to 35 "	" "	66	90	" "	82
Above 35 years	" "	73	94	" "	88

Körösi also finds that it makes but little difference in regard to the vitality of the child whether the father or mother is the older, provided that the difference in ages is not too great. A difference of 10 years seems to be the limit within which the strongest children are produced.

G. N. C.

THE FALL OF THE RATE OF INTEREST AND ITS INFLUENCE ON PROVIDENT INSTITUTIONS.

In *La Reforme Sociale* (Nos. 45 and 46) for November, 1892, appears an article on the above subject by M. Cheysson, with an appended discussion by MM. Juglar, Fougerousse, Gibon, and Cheysson.

M. Cheysson declares that the present decline of the rate of interest contains elements for social and financial revolution. It especially affects provident institutions, societies for mutual insurance, etc. He first enumerates the general causes and notes their effects: The increasing amount of capital, its mobilization and entrance into the market, the competition for investments which become less and less remunerative, lead, on the one side, to a constant reduction in the rate of interest, and, on the other, to wild speculative adventure. In consequence of the fall we observe, *e.g.*, that the *3 per cent perpetuél français*, which represent a capital of 12 milliards, have risen from 70.05 f. in 1869 to 100.45 f. in 1892 (June 15). Other values have had the same history. The recent conversions of debt are also significant. In 1888 the English debt was refunded at an interest of $2\frac{3}{4}$ per cent, which in 1913 will be reduced to $2\frac{1}{2}$ per cent. When the great loans, national, municipal, and industrial, shall have been paid, as appears probable in the next half century, "what enterprises can be imagined to absorb the surplus?" This question M. Cheysson leaves to posterity, to whom we leave "*en même temps que nos bienfaits l'embarras des richesses.*" But for present concern it should be ob-

served that this prospective fund will maintain the present low rate of interest if it does not, indeed, cause a greater decline. The low rate of interest makes new enterprises possible. It diverts capital to agriculture where scientific production is at last made possible. The general result is the improvement of the position of manual labor. The demand is increased, the supply remains stationary, while in addition the products of manufacture are made cheaper. The cost of lodging is above all diminished. A house worth 6000 f. renting for 300 f. at 5 per cent becomes 180 f. at 3 per cent, and the purchase annuity declines from 481 f. to 403 f. On the other hand, the fall of interest deprives the idle of a large part of their income,— they must work or retrench. It is like a phenomenon of depreciation. It is a loss to capitalists, fundholders, and creditors, and a profit to laborers and debtors. It is, M. Cheysson declares, a "democratic phenomenon."

He notes next the special effects of the fall of interest on the accumulation of savings and provisions for old age (*retraites*). These are results which disadvantageously affect those classes which we have just seen to be favored in general. In respect to the first it is assumed as true that a diminution of savings will follow a fall in interest. In regard to pensions it has been found that they are importantly affected. Pensions are calculated on two factors,— the mortality table and the rate of interest. The insurance companies of France have been compelled to revise both. They have adopted new mortality tables, and have reduced the rate of interest from 4 per cent to 3½ per cent, not daring to approach closer the normal rate. Some of the mutuals have proceeded at hazard, without any scientific bases. This has been the history also of the civil pension fund (*caisse des pensions civiles*), in which the deficit has risen at present to 40 millions. Similar difficulties have been met in the pensions of the railway service. But the greatest difficulties have been encountered in the cases of individuals and of mutual companies. With a payment of 50 f. for 30 years (until 55) the laborer obtained a pension of 410 f. at a rate of 5 per cent, but with a rate of 3½ per cent this would be reduced to 270 f., or over a third. Again, to obtain a pension of a franc a day, it would require a contribution for the same period of 41 f. annually at 5 per cent, but of 66.70 f. at 3½ per cent. It is this which leads the laborer to live from day to day, and to demand that the state shall make a provision for old age which is beyond "the individual efforts of the laborer."

The *sociétés de secours mutuels* are very much dissatisfied with the present rate of 3½ per cent. By the law of 1850 the rate of the *caisse de la vieillesse* was placed at 5 per cent. It was reduced to 4½ per cent in 1853, and in 1872 raised again to 5 per cent, to be reduced again in 1882 to 4½ per cent. These rates threw too heavy a burden on the fund which realized no such interest. A large deficit was created. The policy of the directors was to limit as much as possible their unprofitable *clientèle*. This led to a reform in 1886, by which the President fixed the rate for the year ensuing by the average rate of the investments of the year preceding. An immediate reduction to 4 per cent was made, and, finally, for 1892 to 3½ per cent. The history of the unengaged funds (*fonds libres*) and pension funds (*fonds de retraite*) of the mutuals has been similar, being fixed by the *caisse des dépôts et consignations* at 4½ per cent in 1856. But these were assimilated to the *caisse national de la vieillesse* in 1892. The societies were greatly disturbed, and claimed that the preservation of the former rates of interest was a part of the contract with the state, for which they exchanged the restraints of recognition and approbation. Moreover, they had not been financially at liberty to take advantage of the previous high rates which were granted, but had to wait and make their payments for each pension in a lump sum calculated at the then existing rate. Those payments made before the reduction held the earlier high rates during the life of the pensioner. Moreover, they asserted that as the state guaranteed a minimum dividend to the shareholders of the railways without reduction, they, numbering 1,200,000 mutualists, giving an example of thrift and largely aiding to prevent pauperism, were equally entitled to such consideration. The moderates asked that a double annual subvention be allotted to the pension fund; the extremists demanded a fixed rate of 5 per cent for the smaller pensions.

The rates of interest have been through a process of evolution in the Chambers. In 1889 they decided not to pledge a definite rate of interest which involved an indefinite demand on the income of the state, but rather to assist the funds by specific appropriations. Thus, the determination has been to give outright to the clients of the state only the revenues which the funds actually obtain, and thus negative the idea that the state can arbitrarily create the rate of interest. The great danger lies in the fact that an abnormal rate will attract to these funds commercial investments, and not the savings of labor. This

has been the experience of the *caisse de la vieillesse* when the payments have varied with the excess of the interest fixed over the market rate; and this is also true of the *caisse des dépôts et consignations.* The defenders of the privilege declare, however, that they would limit it to the members of the mutual societies, which they claim would prevent any abuse. But this seems first an unjust discrimination against private individuals, and, secondly, it would be no security because it is easy to become a mutualist, and everybody could take advantage of it. The system of granting an interest not acquired is false political economy and leads to false ideas, besides being financially risky. The argument of the mutualists, that the shareholders of the railways have a guaranteed interest is not decisive. They are temporary, and are based on a commercial contract. The pensions are based on payments made under varying economic conditions at a fixed rate. A more serious cause of complaint is the state interference in the financial control of the societies, which prevents them from taking advantage of the periods of high rates of interest, since payments have to be made in a capitalized form at specific times. But the weakness of this complaint lies in the fact that they get, as it is, a high rate of interest. Besides this the pensions are based on payments made by honorary and non-participating members, the payments of the participating members being insufficient to cover the general expenses.

The state assistance for the pensions of the mutual societies began in 1852, at the time of their origin, with a fund of 10 millions, giving a revenue of 510,000 f. This soon became insufficient, and the income of the fund was increased by successive annual appropriations until the total in 1891 was 960,000 f. This subvention is distributed among the "approved" societies according to the payments to the pension fund, the number of participants and the number of the latter over 55 years of age. This gives those societies having a large honorary list a great advantage. It also causes the societies, in their eagerness to get a large portion, to economize unduly. As the capital value of the pension payments is inalienable, and returns to the societies a large amount of property in mortmain is formed. M. Cheysson, in view of the existing deficit and the importance, socially, of encouraging and preserving the societies, advocates a special annual appropriation by the state. It should be applied first to increasing the income of those pensions which have been established since the

lowering of the rate of interest,—since 1892,—and to those of an "alimentary" character, *e.g.*, those of 360 f. and under. The general effect of the fall of interest, M. Cheysson repeats, is to the advantage of the laborer, especially as respects the habitation and the family. The rise of wages and the fall of prices both improve his condition, and give him a better opportunity to save. Credit, moreover, is easily obtainable, and becomes possible to the agriculturist. But the great advantage is as respects the housing. It becomes possible with money at $2\frac{1}{2}$ to 3 per cent to rent and purchase a house in fifteen to twenty years, where formerly rent alone could be paid. This means the consolidation of the family, which has been said to be the most secure insurance for old age.

FRANCIS WALKER.

LIMITATIONS OF STATISTICS.

In the March issue (1892) of the *Rassegna di science sociali e politiche* the scope and limitations of statistics is considered by Prof. Salvioni, in an article entitled *Ai Confini della Statistica.* The following is a summary of the principal positions taken by the author.

The discussion takes the form of answers to the two questions that are propounded at the outset: (1) Are inquiries (especially social inquiries) a part of statistics? (2) Is the so-called monograph (of the family, shops, etc.) a part of statistics? Statistics and inquiry, it is held, have both the same matter to deal with, and it is the office of both to illustrate the economic and social situation of a country; but this affinity does not suffice to make them identical. Again, "it is the office of statistics to collect social facts of every kind for the purpose of recognizing as *descriptive* the political state, and to explore as *investigative* statistics the social state of the nation." But even this fact does not identify inquiry with statistics, for in statistics there is a particular element—"the numerical determination of the facts collected"—that is wanting in inquiry. On the other hand, this distinction is not a sufficient mark of differentiation.

By further restrictions we finally get over and above *expositive* statistics, the doctrine of method, or *statistical methodology.* But *inquiry* has also its methodology, which is so like that of statistics as to suggest the problem of "fusion and separation." Their similarity of method is not confined to any particular kind of inquiry, but has refer-

ence to all inquiries, both public and private. But to solve the problem of "fusion and separation" we must know more definitely what the function of inquiry is, and also whether, considered as a means of social investigation, its expedients are better suited than those of statistics for the discovery of truth. A subordinate question is whether the results of inquiry can enter as statistical data in giving information to expositive statistics.

It is thus found that the relations involved between statistics and inquiry are those of method and results. Put in the form of question the problem may now be more definitely stated: "Does the methodology of inquiry appertain to statistical methodology? Can its results enter into statistical work without altering the character of the latter?"

Before directly answering these questions, Prof. Salvioni critically examines the views of various authors regarding the relation of statistics to inquiry. The distinction, he says, has never been clearly perceived, nor discussed with any scientific precision. Ferraris, however, has touched upon the question more directly than any other writer, but, under the influence of state socialism, he has limited his consideration to public inquiries. These, says Ferraris, are undertaken by modern states in order to learn the conditions of the people, and for this purpose it is helpful to complement them with statistics. He then makes the following distinction between statistics and inquiry: "Statistics," he says, "is susceptible of great extension in time and space, and can pursue its investigations for a long time and upon a vast field. But it always has an irreparable defect,— it is wanting in intensity. Or, although its figures are copious and widely distributed, they are limited to manifesting the exterior aspect of phenomena, and rarely give any sign or indication of the circumstances that accompany them, or the causes that determine them. Inquiries avoid these defects. Having for their subject some special fact they always throw a very clear light upon it; they are made with the greatest publicity, and make use of the knowledge of anyone who knows anything about the subject under investigation, and out of the clash of opinions truth emerges. But while statistics has greater *extensity*, inquiries have greater *intensity*, which, therefore, does not render the former useless, but a precious and very helpful complement to inquiry." Upon this Salvioni remarks that, while Ferraris recognizes the relation between statistics and inquiry, he does not make

any scientific investigation of the difference; and, further, that the distinctions of Ferraris pertain to results rather than method, for it is only in *results* that inquiry is less extensive and more intensive, and this, instead of being a defect, is an advantage.

The views of Gabaglio, Cohn, Meitzen, and others are passed in review, and all are found to be defective. "From the opinions of these authors," says Prof. Salvioni, "there results a nexus, not always definite, between inquiry (especially social and economic) and statistics. The real point of contact seems to be this: Both are instruments of investigating social phenomena. The one treats of or describes *accustomed* phenomena (those which have taken place) and the other attempts to ascertain their *dimensional* functions, but inquiry is satisfied with an indeterminate knowledge, while statistics gives the definite numerical expression of the facts collected. Since inquiry, as well as statistics, starts from social phenomena as the foundation of research, both are a means of observation, and belong, in consequence, to inductive logic,— more strictly to its application to the facts of human society.

"Although, then, the doctrine of inquiry cannot be drawn into the field of statistics, on account of the difference adduced above, and although it cannot be made *subordinate*, it is undeniably *coördinate* with it. In order to exhaust the content of both, it will then be necessary to refer them to a higher category that comprehends each. If, in the authors (above referred to) there is a certain uncertainty, it is easy to explain it by the fact that a *quid statisticum* indissolubly binds itself to and continually accompanies inquiries. Thus, for example: The number of printed questions, the number of those returned without replies, the number lost or thrown away, the sum of the affirmative and negative answers, the number of persons interrogated, etc. Many inquiries, as is well known, have certainly the form, and, indeed, to a certain extent, also the substance of statistics. But this convergence of their concepts does not alter their characteristic distinction, which we have pointed out above.

"Thus far as to the doctrine of statistics. As to the employment of the results of inquiry in statistical work, without changing its character, there seems to be no doubt. Here the consensus of writers is numerous and unanimous. The results of inquiry are truly in part a complement, in part a substitute of statistics, and in both respects can be made a part of *expositive* statistics. Inquiries give more deci-

sive features to abstract laws, or supply lacunæ, and are able to proceed in good fellowship with statistical data."

In brief, according to Prof. Salvioni, inquiry and statistics are related as coördinate departments of the investigation of social phenomena, their results complementing rather than overlapping each other; and their characteristic difference lies in the fact that inquiry is essentially descriptive, and gives only indeterminate information, while statistics seeks to ascertain dimensions, and gives numerical results.

Turning to the second question,— that relative to the monograph, —it is found that there is no definite understanding among writers as to its essence and scope. As understood by our author the monograph is a study of *isolated* (social) phenomena in contradistinction to inquiry, "which studies *all* the facts of a given kind, and which come within the circle of facts and territory of the proposed inquiry: as, for instance, *all* the facts relative to all the unhealthy habitations of a given district; *all* the hygienic and anti-hygienic conditions of the laborers of a definite territory," etc. The monograph, on the contrary, "is a study of *isolated*, but not of *simple*, phenomena," that is, it studies all the facts relating to a given family, workshop, or commune, in reference to some particular feature, such as the delinquents of a family or a commune. Some enthusiasts of the monographic system would extend it so far as to make it include national, and even international, investigations. But this is absurd. It should be confined within rational limits, and within these there is no denying that it will be able to render important service to the investigation of social facts. But the scientific question is: Does the monograph belong to statistical method? According to Prof. Salvioni, it does not, although the distinction is not merely one of number. True, the character of statistics is the numerical determination of numbers, but the family monograph is also concerned with numbers. "Number is only a *formal* element of statistics; for this character alone arithmetic would also be statistics." "The monograph is found at the opposite pole of observation *en masse*, which, to speak emphatically, is the banner under which statistics militates. Besides, to what does statistics aim? To discover the *type* in the variable, the definite in the indefinite, of *numerous social facts*. In the family monograph, on the other hand, the type is presupposed; it is taken at the start, and does not result from an objective elaboration of facts collected,

but from the subjective virtuousness (*virtuosità*) of the collector." "The mongraph is a true description, a true natural history of a family, and is given and proclaimed as the *type* of all others."

So far, what has been said of the monographic system has had special reference to the family monograph, but analogous remarks might be made of the monograph of shops (*officina, i. e.*, large shops or factories), or the criminal monograph. There is, however, this distinction: that, in the monograph of workshops, we do not find the *immediate* institution of the *type*, but a minute analysis of a *fact*, which is used as a complete elaboration of a *group* of *all* facts of a similar kind. That is, monographs of this kind are the preliminary steps of statistics, but not of statistics *per se*. On the contrary, with the criminal monograph "it is statistics that prepares the ground; analyzing, in various parts of the territory, the general criminality of a nation it finds that some parts are more seriously affected by crime than others. The question then arises: Is the greater criminality due to a more intense dissemination of criminal germs in the given district, or to special and more unwholesome centres of infection? Statistics will furnish the answer, but in case it is due to the latter cause, medical statistics ceases and a clinical history of the case begins. Indeed, the criminal monograph is precisely a clinical study of social pathology. Stated in a word, the monograph of the workshop comes before statistics, the criminal monograph after, but both are outside of statistics."

It is finally concluded that besides the statistical method there are two others,— that of inquiry and the monograph,— for the inductive investigation of social phenomena. On the one extreme we have inquiry which is descriptive of *all* the social facts in a given territory, and, on the other, a description of *isolated* facts. Between these, as its limitations or bounderies, there is the exact or quantitative method of statistics. Thus understood they become contradistinguished from each other, and freed from that nebulousness with which they have hitherto been surrounded. From these considerations there follows the further conclusion that society may be studied from three different points of view, viz.: —

(*a*) By the more perfect and precise method of quantitative research in the mass of phenomena, principal or auxiliary, — the statistical method;

(*b*) By the complementary and substitutive method (in reference

to statistics) of inquiry, which is connected with the preceding through the mass of observations and through its function of *measuring*, but it is distinguished from it through the lack of precision of the *description*, and through the subsidiary and non-systematic application of numbers;

(*c*) By the method of investigation by cases, types, or individuals (whether simple or complex, makes no difference), and which is distinguished from the others either because it starts from a type, while they search for one, or through its naturalistic character, that is, following after the model of natural science.

STEPHEN F. WESTON.

SUICIDES IN THE AUSTRIAN ARMY IN THE YEARS 1873-90.

In the last April number of the *Statistische Monatschrift* (Austria) Josef Roth has an article upon suicides in the German army during the period 1873–90 (*Die Selbstmorde in der k. u. k. Armee in den Jahren 1873–90*).

The total number of deaths by suicide in the army during this period was 5808. Of these 3431 occurred in the Austrian division, 1982 in the Hungarian division, and 395 in the Occupation department (*Occupationsgebiete*). This makes 120 deaths per 100,000 for the whole army, of which there were 123 deaths per 100,000 in the Austrian army, 125 in the Hungarian army, and 87 in the Occupation department.

Suicides as a whole are slightly increasing, and the rate for the entire army during the last four years is considerably higher than 120 per 100,000.

Race evidently plays an important part in the number of suicides. In 980 cases taken from regiments in which the different nationalities are kept separate, suicides occur in the following order: Czechs, 17 per cent; Magyars, 15 per cent; Poles, 15 per cent; Roumanians, 14 per cent; Germans, 13 per cent; and Croatians, 8 per cent.

In Hungary and Croatia the army list gives a smaller number of suicides than does the civil list, but in Austria this is reversed, and the number of suicides in private life exceeds that of army life. There seems to be also a difference according to religious belief; the Jews, for example, have the greatest aversion to suicide.

The causes of suicide in the army are numerous, but the greater

number by far is caused by fear of punishment; the next greatest cause is dislike of military service. Of suicides, the causes of which are known, 35 per cent were from the first cause, and 17 per cent from the second. In 41 per cent of all cases the cause was unknown.

It is in the ranks and among the lower officers that the rate of suicides is increasing, and Roth concludes from this that the love of military service is diminishing in some countries. G. N. C.

TEN YEARS' GROWTH OF THE CITY OF LONDON.

Ten Years' Growth of the City of London. Report, Local Government and Taxation Committee of the Corporation, by James Salmon, Chairman. London, 1891. 139 pages.

The Imperial census is that of the night, or permanent, population, and according to it one might be led to infer that the City was on the wane, since it stated the population in 1861 to be 112,063; in 1871, 74,897; in 1881, 50,652; and in 1891, only 37,694. The square mile of territory embraced by the City is bound to become more and more non-residential, particularly for two reasons: first, because of the constantly increasing business demands, raising values and rents beyond what can profitably be paid for tenement purposes; and, secondly, on account of the railway facilities into the suburbs. The City's night population may eventually include hardly anybody but janitors, watchmen, and the like.

The day census introduces one to the true City,—the mercantile and commercial population. This in 1866 was 170,133; in 1881, 261,061; in 1891, 301,384. Of the 301,384, in 1891, 29,520 were employers, 202,213 male employes, and 50,416 females; while there were 19,235 children under fifteen years of age.

A census was also taken of the passenger and vehicular traffic, of carriages and persons entering the City on a fixed day, including those coming by rail, but not including the railway carriages. The number of persons who entered the City on foot or in vehicles between 5 A.M. and 9 P.M. (the day traffic) was 1,100,636; between 9 P.M. and 5 A.M. (night traffic), 85,458, making a total of 1,186,094 for the twenty-four hours. The largest number for a single hour was 132,835, between 8 and 9 A.M., while between 9 and 10 A.M. there were 124,942. The

smallest number was between 2 and 3 A.M., 656. The chief entrance was by way of London Bridge, over which 107,421 came.

The number of vehicles entering the City between 5 A.M. and 9 P.M. was 85,826; between 9 P.M. and 5 A.M., 6,546; or 92,372 for the twenty-four hours. Between 8 A.M. and 7 P.M. the number did not vary greatly, ranging from 5522 to 7860 an hour, the maximum being between 10 and 11 A.M. The enumeration was of persons and vehicles entering the City. Naturally, about the same number must also have gone out, but no account was made of those.

F. A. CURRIER.

WORK OF THE STATISTICAL SEMINARY AT THE UNIVERSITY OF VIENNA.

Bericht über die thatigkeit des statistischen Seminars an der K. K. Universität Wien im Wintersemester, 1891–92. By Dr. Hermann v. Schullern-Schrattenhofen. In the *Statistische Monatschrift*, October, 1892.

We have here a report of the work done in the statistical seminarium of the University of Vienna during the last winter semester. The subject chosen for investigation was the statistics of taxation, and the field was divided among the various attendants upon the course. As a result, papers were prepared upon the following topics: 1. The place of an income tax in a system of taxation. 2. The report of the Austrian government respecting direct personal taxes. 3. Income taxes in Saxe-Weimar, Hesse, Saxony, and Hamburg. 4. The abolition of exemptions from real property taxation in Prussia. 5. The taxation of alcoholic liquors in Austria, and its economic effects. 6. The taxation of transfers of stocks and commercial paper. 7. The taxes upon rent in Lower Austria. 8. Austrian municipal finance. 9. International comparative finance statistics.

Of the many interesting statistical tables compiled and presented, only a single excerpt can here be given. For example, the relation of the income tax to other direct taxes in Austria, for the year 1892, is shown on the following page.

The direct taxes produced 18.3 per cent of the total governmental revenue. And during recent years the development of the income tax has been greater than that of other kinds of direct taxes.

Direct Taxes.	Gulden.	Per Cent.
Land tax	36,052,000	33.7
Building tax	30,200,000	28.3
Five per cent tax	1,856,000	1.7
Tax on business profits	11,284,000	10.6
Income tax	26,442,000	24.7
Collection fees	720,000	0.7
Interest from delinquents	318,000	0.3
Total	106,822,000	100.0

VICTOR ROSEWATER.

LOCAL PUBLIC RECORDS OF MASSACHUSETTS.

The Report on the *Custody and Condition of the Public Records of Parishes, Towns, and Counties* in Massachusetts for 1892 has recently appeared. In it the Commissioner, Robert T. Swan, makes complaint of the manner in which state laws are neglected by many town and county clerks.

The social position of the state is based largely upon the records furnished by the cities and towns, and the State laws require such records to be scrupulously cared for. In his Report, Mr. Swan shows what little attention these laws have received, and how carelessly records are kept. There has been some improvement since 1890, but in many places the current events are still imperfectly recorded or sometimes grossly neglected. These facts serve to draw our attention to the uncertainty which must accompany our social laws so long as they are founded upon records so poorly managed.

The assessors' records in Massachusetts towns, prior to about 1825, are usually preserved in files or in very small pamphlets. From that time until about 1860 they are kept in larger books, usually unbound. Since 1860 they have been kept in the cumbersome form furnished by the Commonwealth. The records are usually poorly protected from fire and flood, and comparatively few only are stored in vaults.

Mr. Swan makes the usual complaint in regard to the registration of births, marriages, and deaths, which at present is based largely upon a house-to-house canvass. Returns made in this way cannot be reliable, and illegitimate births are sure to be concealed from the canvasser.

G. N. C.

THE CRIMINAL STATISTICS OF BUENOS AYRES.

Provincia de Buenos Aires. Memoria del Departamento de Policía. 1892. Pp. 196; tables.

This account, presented by Guillermo J. Nunes, gives statistics of crimes of various sorts committed during the year 1891 in the Province of Buenos Ayres, classified by five groups, by specific offences, and by jurisdictions. It is suggestive as throwing light upon social conditions in a South American country. Comparisons by ratio with the year 1890, and a comparison by ratio of total criminality with that of various other countries, are given. The account contains also statistics of accidents, suicides, drunkenness, and of matters of minor interest.

As the comparison with other countries does not use the different groups of crimes, a comparison has been made with England and Wales, and a new table has been constructed. A comparison with some country of southern Europe would be more valuable, but the necessary statistics were not accessible.

It must be remembered, as shown by Dr. Robert Giffen,* that for various reasons a comparison of criminality of different countries is not very satisfactory; administration may be more efficient, or laws more numerous, in one country than another. In England "destroying of trees, shrubs, etc., growing" is included among "crimes against property." Such items are omitted in the table.

	Percentage of Total Crimes.		Proportion to 100,000 of Population.		Actual Numbers.	
	Province Buenos Ayres.	England and Wales.	Province Buenos Ayres.	England and Wales.	Province Buenos Ayres.	England and Wales.
Against the Person	46.7	4.7	245	6	1,826	1,834
" property...	44.5	84.1	233	113	1,736	32,543
" chastity...	2.2	3.8	11	5	84	1,489
Sum[1].....	93.4	92.7	489	124	3,646	35,866
Total crimes.....	100.0	100.0	524	134	3,902	38,650
Drunkenness.....	.....	.....	1,081	660	8,044	189,746
Population.....	.....	.....	100,000	100,000	744,197	28,762,287

[1] Certain crimes are not included: in Buenos Ayres those peculiar to public employes, etc., and in England those against the game laws, etc.

The numbers for the province of Buenos Ayres are taken from the *Memoria del Departamento de Policia*, 1891, p. 180. The population is from p. 184.

The numbers for England and Wales are from the *Judicial Statistics*, 1890, p. 20, addition and subtraction having been performed to make the grouping as nearly as possible identical with that of the *Memoria*. The number for drunkenness is from p. 25. The population is given as estimated for 1890 in the Statesman's Year book for 1892, p. 16.

The numbers are in both cases the numbers of offences taken cognizance of by the police, not the numbers of offenders convicted.

* *Publications American Statistical Association*, Vol. III, p. 200.

L. P. Lane.

THE AVERAGE LENGTH OF LIFE IN FRANCE.

In the *Revue Scientifique* of December 24, 1892, V. Turquan has an interesting article upon the average length of life in France, in which he shows that the average is gradually increasing, both for males and for females. If we take into consideration the total number of years actually lived, the increase in the average length of life may be partly explained by the diminution in the birth rate, a social phenomenon which has occasioned much discussion in the past few years. The explanation of this statement is very simple; the more births there are in a certain determined population the more deaths there are of infants, and in consequence the average of years lived by the entire community is so much less. If we suppose that the number of births is diminished, we may assume that the number of deaths of infants is also less; and, provided that the conditions of life remain the same, this diminished death rate among infants will result in an increased average length of life for the entire community.

In addition to this, however, the increase of the average length of life is affected by the number of old people in the community. If this number grows each year the average length of life will also increase.

In this article Turquan has worked out the average length of life for males and females independently, and for both sexes, not only for the entire country, but also for each of the 87 departments in France.

Fifty years ago the average length of life in France was 32 or 33 years, but the average for the last 32 years is 38 years and 4 months for women; and 36 years and 2 months for men; and 37 years and 3 months for both sexes. This average has increased sensibly during the last few years, and is now above 40 years. This latter increase, Turquan asserts, is due to the effect of hygienic measures, and to the decline of the birth-rate.

The different sections of France show different averages, and, as might be expected, these are lowest where sanitation is poorest, and where births are most numerous. These averages vary from 28 years and 1 month to 51 years. The difference between the averages for men and women is greatest in the western part of the country. The reason given for this is that the male portion of the population is mostly composed of sailors or fishermen.

The following table shows the average length of life by periods: —

Period.	*Average Length of Life.*
1806–1810,	31 years 6 months.
1811–1815,	31 " 10 "
1816–1820,	31 " 10 "
1821–1825,	31 " 5 "
1826–1830,	32 " 5 "
1831–1835,	33 " 6 "
1836–1840,	34 " 11 "
1841–1845,	35 " 0 "
1846–1850,	36 " 0 "
1851–1855,	36 " 8 "
1856–1860,	36 " 4 "
1861–1865,	36 " 5 "
1866–1876,	37 " 3 "
1877–1886,	40 " 2 "

The following table also shows the effect of the increase in the length of life for males: —

From	1820–1830,	for	each	100	births	there	were	in	20 years	59.5 living.
"	1831–1840,	"	"	"	"	"	"	"	"	61.7 "
"	1841–1850,	"	"	"	"	"	"	"	"	60.7 "
"	1851–1860,	"	"	"	"	"	"	"	"	61.5 "
"	1861–1870,	"	"	"	"	"	"	"	"	62.6 "
"	1871–1880,	"	"	"	"	"	"	"	"	62.1 "
"	1881–1890,	"	"	"	"	"	"	"	"	63.0 "

The higher average for women is due to the fact that the mortality among male children is greater than among female children, and that more women live to an old age than do men.

G. N. Calkins.

NOTE FROM MR. FRANCIS GALTON TO MR. GEORGE K. HOLMES ON THE SUBJECT OF DISTRIBUTION.

62 RUTLAND GATE,
LONDON, OCT. 17, 1892.

DEAR SIR:

I have read the paper on "Distribution" in the *Publications of the American Statistical Association*, which you were so good as to send me, but it strikes me that an "Index of Inequality" could be got in a simpler and yet more exact way, as follows: I take the figures from the 2nd and 3rd columns of the Maryland part of Table III, p. 150, having first reduced the 950 owners to 100, and the amounts owned proportionally, multiplying both sets of entries by $\frac{100}{950}$. I have also only cared to work to the nearest 10,000 dollars.

A. Number of Owners.	B. Amounts Owned.	C. Amounts that would have been Owned if each Person had the same Amount.	D. Inequalities, that is to say, the Differences between B and C, irrespective of Sign.
25	$10,000	$190,000	$180,000
20	20,000	152,000	132,000
19	30,000	144,000	114,000
13	50,000	99,000	49,000
11	90,000	84,000	6,000
7	120,000	53,000	67,000
3	110,000	23,000	87,000
2	330,000	15,000	315,000
100	$760,000	$760,000	$950,000

Whence —

Mean amount owned by each (E), $7600.

Mean inequality (F), $9500.

Index of inequality $= \frac{F}{E} = 1.25$.

For some purposes F alone might be wanted; for others, F and $\frac{F}{E}$. E is, of course, implicitly given in the latter case.

Permit me to criticise the terms of your query in p. 141, viz., "Is wealth more widely, evenly, and generously distributed in . . . ?" Either those three adjectives mean the same thing, or they do not. If they do, two of them are superfluous, and, in fact, I have assumed them all to mean *evenly*. If they do not, your query involves three independent variables, and could not be answered without explaining how they are to be rendered commensurable.

Yours faithfully,

FRANCIS GALTON.

The preceding letter from Mr. Galton will attract attention, not only because it comes from the most eminent authority on mathematical measures of distribution, but because of its original process of computing index numbers. An accurate measure of the inequality of the distribution of wealth within a group of wealth owners is the problem, and the solution proposes to ascertain the inequalities of the actual distribution as compared with a perfectly even distribution, and to establish the ratio between the average individual holding and the average individual inequality. It is an attractive scheme, and I have made some computations to discover comparative results.

The index numbers that measure the distribution of the amount of certain classes of government bonds among male, female, and total holders in 1880, in Maryland, are these: males, 1.253; females, 1.249; total, 1.255.

The table of facts from which these index numbers are computed is published in the issue of the *Quarterly Publications of the American Statistical Association*, for June and September, 1892. Upon comparison of the index numbers, it is evident that they must be computed without approximations, because their differences are so small. These are often not found until the third decimal place is reached.

Until a standard is agreed upon, a scheme for measuring the distribution of wealth can be criticized only by subjecting it to mathematical judgment, and by determining whether it is practically consistent in its results. A distribution in which one person owns $1000 and another $100,000 would seem to be half as unequal in degree as one in which one person owns $2000 and another $200,000. Mr. Galton's index number, however, is the same in these cases, since the average holding and the average inequality are precisely doubled by the doubling of the actual holdings.

The average inequality does not always vary with the index number, and its use is not clear. Whether a group is composed of nine persons worth $2000 each, and one person worth $1,000,000, or is composed of one person worth $2000, and nine persons worth $1,000,000 each, makes no difference with the average inequality, although it does with the index number.

Since the average in this scheme does not preserve the distinction between rich and poor, the question arises whether it may not produce an erroneous index number of inequality of distribution.

Perhaps I have not sufficiently experimented with this scheme to

be sure that its application to the groups of wealth owners mentioned above does not lead to objections that are more apparent than real.

Regarding Mr. Galton's criticism, that the measure of the distribution of wealth proposed by me employs three independent variables, the reply may be made that the distribution of wealth has these three aspects: —

1. All individuals of the population do not own wealth. Less than half of the people possess wealth in sufficient quantities to be worth an account, and the proportion of the owners ought to be represented to measure what I have termed the width of distribution.

2. Another measure is wanted to determine the inequality of the distribution of wealth, not among all the people, but among its owners. An index can be computed that is a compound of width and of inequality, but it seems to me to be undesirable.

3. The generosity of distribution calls for a third measure. There may be no substantial difference between two communities in respect to the width and the inequality of distribution, but one community may have much more wealth than the other. The average, or Mr. Galton's E, affords this measure.

GEORGE K. HOLMES.

REGISTRATION REPORT OF MASSACHUSETTS.

Fiftieth Report of Births, Marriages, and Deaths in the Commonwealth, and returns of Deaths investigated by the Medical Examiners, for the Year 1891. Pp. 145. Boston, 1892.

To those who are familiar with the precise and elaborate registration reports of Massachusetts, the report of 1891 will be a surprise and a great disappointment. We are at a loss to account for the change from a compilation which has been universally accepted by statisticians as a model of tabulation and presentation to the present inadequate number.

The reports of previous years were compiled for the use of statisticians as well as for the general public. This, as the editor says, is no longer the case. A student of social science must either go without data hitherto furnished or else laboriously work them out for himself. The principle upon which the work is compiled is expressed on page 113, as follows: "It is not intended, however, in this report to pre-

sent all the elaborate tables heretofore presented where data are arrived at by an unending series of sums in long division, and by permutations and combinations of figures, which data are, if to anyone, of value only to the statistician who might well himself devote the time and labor necessary to ascertaining the facts desired." This paragraph clearly indicates that the compiler has little sympathy for statisticians, and chooses to ignore their usefulness. He forgets that by working out these data himself, with all the necessary figures at hand, one man may do the work which perhaps otherwise scores of statisticians will have to do individually, and with much greater labor. To a limited extent he works out these data for the "average reader" in a portion of the report entitled "editorial observations." Here he puts together various facts derived from data in the files of statistics kept at the office of the Secretary of State, and these facts he puts down in words, in one or more paragraphs, instead of in figures, as heretofore. For example, on page 115, he makes the statement that the excess of living births over deaths is greater than the excess in any year since the beginning of registration. This fact should be contained also in a table, which at the same time would contain many other facts not mentioned in any paragraph of the report, such, for instance, as the rate of increase of this excess, its relation to the entire population, etc.

Such a method may do for the "average reader," but in a branch of social science, such as vital statistics, the "average reader" is scarcely concerned. Only a small portion of the population ever read the registration report, if, indeed, they know of its existence. As for those who do read it, it may be asserted that they have more use for the tables, which represent so many and such diverse ideas, than they can have for a worded paragraph which represents but one idea of one man. Different people see the same thing in different lights, and thus it may come to pass that one table of statistics can represent a variety of ideas which could be brought out by different people, and all of which would not be conceived by an ordinary compiler of statistics.

Another deviation from regular statistical methods of presentation is shown by the following paragraph from page 113: "It has been thought wise not to attempt to draw inferences, or make ratios and percentages from uncertain data, such, for instance, as an "estimated"

population. Such an "estimate" must of necessity be inaccurate as a basis of figuring decimal percentages, and the results obtained are of no more actual value than percentages calculated on the previously ascertained population, as shown by state or national census." This is entirely contradictory to the opinions of the most experienced and ingenious statisticians of England and the United States, and the subject has been investigated and described with the greatest care and thoroughness. The importance of rates based upon "estimated" populations is sufficient to warrant their acceptance by statisticians in all countries, and they form a common basis for the comparison of the social status of nations. The editor criticizes estimates of population by showing that such estimates, made in different years, are not the same, and he gives in illustration the comparison of the estimates of population for 1887 in the 1889 report and in the 1890 report. These estimates are 2,058,647 and 2,060,861, respectively, and the corresponding death rates are 19.80 and 19.78. The difference in the estimates of population amounts to about one-tenth of one per cent, and the difference in death rates to about one death in 50,000 persons. According to his method of computing the death rate for 1887, the difference in rates would be 1.21 per 1000, or 60 times greater than the difference which he criticizes. Such criticism is far-fetched. Indeed, the next refinement would be the abolition of all rates, because no census, whether state or national, can be absolutely correct. Rates based upon one stated census for a period of years would be worse than useless, for they *must* be invariably false, since the population for different years is never the same.

In all countries it is generally admitted that the population may be supposed to increase during a certain time at the same rate, as it did during the preceding intercensal period, although this of course cannot be strictly estimated where there is a moving population due to migration. Estimates are approximate, however, and serve to show the general increase of population with sufficient accuracy for comparison. Thus, in the Registration report of England for 1890, the Registrar furnishes the following table, in order to show the small divergence between death rates per 1000, derived from estimates of population based upon the preceding intercensal rate of increase and those derived by regular increase of the population, as shown by a later census: —

1.	2.	3.	4.
Year.	Rates Based upon Population Estimated from Intercensal Period 1871-81.	Rates Based on Increase, as shown by the Census of 1891.	Difference between the Rates in Columns 2 and 3.
1881	18.88	18.89	0.01
1882	19.56	19.62	0.06
1883	19.54	19.64	0.10
1884	19.51	19.66	0.15
1885	19.01	19.21	0.20
1886	19.28	19.52	0.24
1887	18.79	19.07	0.28
1888	17.80	18.11	0.31
1889	17.87	18.22	0.35
1890	19.12	19.55	0.43

From this table it is seen that the differences between original estimates and those based upon a later census are in no case greater than .35 per 1000 (the rate for 1890 is based in the report for that year upon the census of 1891), or about one death in 3000 persons, and such a difference may, for all practical purposes, be disregarded.

Now, while statisticians of all countries are agreed that estimates based upon rates of increase during the last intercensal period are legitimate, there is a variety of methods employed to get these rates of increase.

In a country where births exceed the deaths the population should increase by regular geometrical ratio, like compound interest; but in a country where the population is constantly changing by migration this rate is not accurate; for this reason it has been the custom to assume that the rate of increase during intercensal years has remained the same as that of the last preceding intercensal period. Some statisticians call this annual increase the nth part of the entire increase in population during the period of n years. Thus, if the increase in population of Massachusetts for 5 years is 500,000, the yearly increase, according to this method, would be 100,000. Such a method, however, is not so exact as to consider the increment of population an increasing quantity during the intercensal years. Calling r the annual increase per unit of population, we should have at the end of one year $1+r$, and at the end of the second year the increase would be denoted by $(1+r)^2$, and at the end of five years the increase would

be denoted by $(1+r)^5$. The annual rate therefore derived from the increase in five years is the 5th root and not the 5th part of the quinquennial rate of increase. This can be expressed as follows: let P denote the population at any time, and P^1 the population at any previous time, and n the number of years between P and P^1, then $\sqrt[n]{\frac{P}{P^1}} = r$, $1 +$ annual rate of increase.

Of these methods the latter is used most extensively where careful estimates are required, and is usually employed in England for the estimation of the population during the intercensal years. In Massachusetts, on the other hand, the former method has been used of late years, and the report of 1890 contains a table of the estimated population during intercensal years between 1845 and 1890. For a few years (1881 to 1885) the population was estimated in the reports for those years by the numbers of assessed polls; the figures, however, derived in this way, are not so trustworthy as by either of the above methods. The following table shows the difference in these two methods for the 10 years 1880–90: —

	Arithmetical Estimate.	Geometrical Estimate.	Difference.
1880*	1,783,085	1,783,085	.....
1881	1,814,896	1,813,820	1,076
1882	1,846,707	1,845,084	1,623
1883	1,878,518	1,876,887	1,631
1884	1,910,329	1,909,237	1,092
1885*	1,942,141	1,942,141	.....
1886	2,001,501	1,998,174	3,337
1887	2,060,861	2,055,191	5,670
1888	2,120,221	2,115,131	5,090
1889	2,179,582	2,176,150	3,432
1890*	2,238,943	2,238,943	.....

* Census year.

These differences would affect but little the computations of rates, etc. It is better, however, to indicate the more approximate population. Death rates based upon arithmetical estimates are a little too low.

According to the geometrical formula given above, and assuming that the rate of increase of population of Massachusetts is the same as it was during the period 1885 to 1890, we find the population of 1891 equal to 2,303,537. Having given the number of deaths 45,185,

we find the death rate is 19.61, instead of 20.18, per 1000 of the living population. The birth rate, too, should be 27.35 instead of 28.15, and the excess of births over deaths should be 7.74 instead of 7.97. The marriage rate should be 9.41 instead of 9.68.

Compared with the estimated population, the death rate from scarletina should be 1.068 per 10,000 instead of 1.097, and this rate is smaller than any previous rate, except for the years 1889 and 1890. The mortality from typhoid fever should be 3.5 per 10,000 of the entire population instead of 3.7, and this rate is less than that for any year for the last 30 years. The mortality from cholera infantum is 12.02 per 10,000 instead of 12.3. The rate for deaths from diseases of the kidneys should be 6.5 per 10,000 instead 6.4. This error is due to careless computation by the editor, and according to his method it should be 6.6.

Throughout the report the editor makes the mistake of comparing the rates for 1891, based upon the census of 1890, with those of previous years, which are based upon estimated populations. To be consistent he should have worked out these rates according to the population as given in the different census years.

The estimated population for 1891 accordingly makes erroneous certain statements in the registration report. For example, the marriage rate is greater than that for any year since 1887 instead of 1883. The death rate is higher than that for any preceding year since 1888 instead of 1875. One person was married to every 52.17 of the population instead of every 51.6. The statement is made that there were more deaths under one year in 1891 than in any other year since the beginning of registration. This conveys an erroneous idea, for we should compare by rates rather than by absolute figures. The rates for deaths under one year for 1891 was greater than that for any year since 1874.

On page 119 of the Report the number of widowers who married maids in 1891 should be 1829 instead of 1827, according to the tables on page 25, and the number of widowers married should be 2778 instead of 2841; and, according to these same tables, the number of widows married in 1891 should be 1890 instead of 1940.

Still further inaccuracies might be noted; for example, the death rate according to the population of 1890 is given as 20.18 per 1000, on page 115, and 20.13 on page 122. Also, 1891 on page 128 should be 1890. On page 122 there is a gross error in proof-reading, the

decimal point being misplaced in twelve cases. But these are minor errors, and might occur in the best of reports.

These few facts are sufficient to show the inadequacy of the registration report. A few tables are probably accurate, but the numerous errors throughout the volume necessarily make one sceptical in the use of even these. As a means of showing the position of Massachusetts in 1891, relative to that of previous years, the report is almost worthless, and equally so for comparisons with the social conditions of other states and countries. It is much to be regretted that the report of 1891, in the series of valuable and instructive registration records of Massachusetts, can be used with so little confidence.

G. N. Calkins.

THE NECESSITY OF A REVISION OF THE CLASSIFICATION AND NOMENCLATURE EMPLOYED IN THE VITAL STATISTICS OF MASSACHUSETTS.

By S. W. Abbott, M.D.

Part of a Paper read before the Massachusetts Medical Society, June 8, 1892.

In the following paper I do not propose to treat exhaustively of the subjects of the medical nomenclature and classification of diseases, but rather to introduce the subject in a suggestive manner with the view of asking the question whether any changes are necessary, and if so what changes, in the classification and nomenclature now employed in the registration of deaths in this state.

What are the primary objects of the classification and nomenclature of diseases? An English writer has clearly said, "a good classification aids and simplifies the registration of diseases, helps toward a more easy comparison and knowledge of them, and toward the storing of experience respecting them, and facilitates the discovering of general principles from the collected, grouped and compared phenomena."[1]

In addition, medical nomenclature and terminology furnish the means for separating and distinguishing diseases and causes of death. Thorough registration must depend to a considerable degree for its efficiency upon the perfection of these means. The classification of diseases or causes of death differs little, if any, in its objects, from

[1] Elements of vital statistics. Arthur Newsholme, M.D., London, 1889.

the great systems of classification employed in the different departments of biology.

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Two centuries ago the classification and nomenclature of disease was widely different from that of today. Who can tell how far that of today differs from that which will become the admitted classification of two centuries hence? This want of uniformity interferes with the interpretation of medical statistics, especially when such statistics cover a long period of time. So far as the larger groups or divisions are concerned, there is no way of avoiding this disturbing cause.

The classification of the seventeenth century can scarcely be called a classification. In the mortality statistics of the city of London, compiled by Capt. John Graunt of the Royal Society, and embracing the period from 1629 to 1660, no classification is attempted, and while the nomenclature includes many terms which are still in common use, there are many others which contribute quite largely to the mortality lists, which have no place in modern nomenclature. The following are a few of these terms: Impostume, Chrisoms, Jaw faln, Calenture, Planet, Flox, Livergrown, Woolf, Rising of the Lights. Some of these were indicative of a superstitious origin, others were merely the names of symptoms and not of diseases.

In the next century, the eighteenth, Cullen attempted to bring order out of confusion by proposing four general divisions or classes of disease. This was a decided advance beyond the confused methods of his predecessors, and his four classes of (1) The Pyrexiæ, (2) Neuroses, (3) Cachexiæ, and (4) Locales served to a considerable degree as a basis for the modern nosology of the present century, that of the Royal College of Physicians, now in common use among English speaking physicians.

* * * * * * *

The international importance of a conventional system of medical nomenclature and classification becomes yearly more apparent, and the subject forces itself to the front in the great scientific bodies which convene at regular periods throughout the civilized world. The International Medical Congress, the International Congress of Hygiene, and the International Statistical Congress have all deemed the subject worthy of consideration. It is in these bodies that the foremost men of science of different nations often come in contact, and opportunities are offered for comparing and unifying existing methods of work.

The following governments and authorities now have the most complete and thorough system of registration of vital statistics: —

Great Britain, the collection of whose vital statistics is made by the Register General.

Germany, by the Royal Health office.

Italy, under the direction of the Department of Agriculture, Industry and Commerce. Prof. Bodio.

France. Published by the Consulting Committee of Public Hygiene.

Austria. The Royal Central Statistical Commission.

Hungary. The Weekly Bulletins of International Statistics. Prof. Josef Körösi.

Belgium. The résumé of demography and medical statistics by Dr. E. Janssens.

Sweden. Government Medical Statistics.

Switzerland. Monthly and yearly Bulletins of the Statistical Bureau of the Confederate Cantons.

To these should be added the mortality reports of the ninth, tenth, and eleventh censuses of the United States (the latter being now in course of publication), and the registration reports of such of the older states as have established a system of registration.

Defects of our present system of registration. During the past ten years or more several earnest attempts have been made, in which members of this society have occasionally taken a prominent part, to secure in Massachusetts a Medical Practice Act, which would secure, both to the profession and to the people at large, such advantages as are enjoyed in other states having similar Acts in force. No greater argument could be found for the enactment of such a statute than that which may be found in a careful perusal of the certificates of deaths which are annually returned to the state authorities. Herein is also a standing argument for better medical education.

How may this defect be remedied? In the first place, the nomenclature and classification should be made to conform to the progress of medical science. Secondly, more thorough medical education should be constantly encouraged. Thirdly, the administration of the collection of vital statistics should be improved. The first authority to receive and collect the individual certificates of death from undertakers and physicians is the registrar in cities and the clerk in towns. A decided improvement has been effected in recent years by adding the authority of the local Board of Health, so that the registrar or

clerk becomes the supervisor or collector of certificates of death, while the Board of Health issues permits for burial. But unfortunately, in at least one hundred and fifty towns in the state, no Board of Health exists, except the *ex-officio* Board, the Selectmen, a Board which is never elected in consequence of its expert knowledge of vital statistics. In some of the southern countries of Europe local inspectors are appointed (leichenbeschauer), whose duty it is to inspect or visit every household where a death has occurred, and see that the certificates of death are properly returned. An army of such officials would hardly be in keeping with our own form of government, but a decided improvement might be made by requiring that all certificates of death in small towns should be submitted to some district medical authority at stated intervals, such authority to have power to return all deficient or erroneous certificates for revision to the original signers. Several thousand such letters of inquiry are annually issued in England for the purpose of correcting the returns. In addition to these improvements, the entire work of registration should be placed under efficient medical supervision.

Let us now examine briefly the system of classification in general use in Massachusetts, which was copied almost identically in 1855 from that adopted in England, and is nearly the same as that advised by Dr. Farr, well known as the foremost English authority in his day.

The general divisions adopted are five in number: —

1. Zymotic Diseases.
2. Constitutional "
3. Local "
4. Developmental "
5. Violent Deaths.

In this connection these should all be considered as groups of causes of deaths, and not as diseases.

For example, the entire fifth group is composed, not of so many names of distinct forms of disease, but of different modes of death by external causes, or, in other words, by violent means.

In the class of Deaths from Developmental Causes, *old age*, for example, a most common term in death certificates, cannot be called a cause of death, much less a disease. It is simply a period of life, and the use of the term in certificates is simply a confession of our inability to give an exact statement of the true cause.

Let us now examine the list more closely.

The first question I have to propose is whether the term *zymotic* as a general name of the first class or division may not be supplanted by some term which is better adapted to the progress of medical science.

Does the term *miasmatic* properly describe the diseases of the first group of Class I?

Does not typhus fever belong in the primary list?

Anthrax, fifty years ago, was a synonym for Carbuncle. Is it so considered at the present day?

Should not such terms as Metria and Nephria, now obsolete, be dropped from the list?

Should not the term Intermittent Fever be introduced into the primary list? (Ague scarcely covers the exact meaning.)

In Class II of the list now in use (Constitutional Diseases) may be found the most destructive of all diseases in our climate and in our state (Tuberculosis). It was placed in this class according to the belief of the profession of fifty years ago. Does not modern observation, and a more intimate knowledge of its history, require that it should be placed in the First Class with other infectious diseases?

Under Class III (Order 1), nervous diseases, we find at the head of the list the very indefinite term Cephalitis. Just what is meant by this term it would be difficult to tell. It appears to be employed at present as a convenient omnibus into which are packed all deaths from diseases of the brain which cannot be otherwise classified. More than six thousand persons (or over two per cent of all deaths) are said to have died of Cephalitis in Massachusetts in the five years ending with 1890.

In the same list of nervous diseases no place is given to deaths from diseases of the spinal cord, except those which may be included in the meaningless &c. at the end of the list.

In the division of diseases of the organs of circulation, Class III, the deaths attributed to heart diseases appear to have increased from a total of 352 in 1850 to 3417 in 1890, and when these numbers are compared with the living population at those periods, we find that the actual increase amounts to nearly five-fold.

Two causes may be stated for this apparent excessive increase. One is the tendency in later years to more accurate diagnosis on the part of educated and intelligent medical men. Many deaths were

certified in the earlier years of registration, as deaths from dropsy, a term now very much less used, the disease being stated instead of the symptom. Another cause exists undoubtedly in the fact that in the past ten years the term "heart failure" has taken so strong a hold as to be employed in many certificates where no disease of the heart existed, either functional or organic. Some heroic remedy is needed for the cure of this evil.

These are but a small portion of the defects to which I have called your attention. Others exist in the employment of mere symptoms in place of the names of diseases, as in the terms paralysis, convulsions, dropsy, and also in the use of such indefinite terms as hemorrhage, tumors, &c. On the other hand, it must be acknowledged that very great improvement has taken place in this direction in the past fifty years of registration. The ratio of deaths certified as having taken place from unknown or indefinite and ill defined causes has diminished from 5.7 per cent in 1868 to 1.2 per cent in 1890.

The mortality attributed to diseases of the kidneys in Massachusetts in 1850 was only 18, while in 1890 it had increased to 1273. It is not to be understood that this enormous increase of more than sixty fold, and more than thirty fold when compared with the population, is an actual increase, but is due to better medical education, and especially to a more correct diagnosis. The same is true of diphtheria, a term which has no place whatever in the registration returns until 1858. We are not, therefore, to understand that diphtheria (a disease which is very carefully described both by Hippocrates and Aretæus) appeared for the first time in Massachusetts in 1858.

The registration of the causes of death in any community, whether it be a city or a nation, furnishes the basis for sanitary work, since it is by means of the comparison of the registration returns of different countries and different cities that we are enabled to judge of the comparative prevalence in them of those diseases which are, in some degree at least, within the control of mankind, and hence are preventable. A thorough and efficient registration offers to us the opportunity of studying the effect of many conditions upon the health of the people, such as the conditions of sex, different age-periods, density of population, occupation, civilization, intemperance, locality, seasons of the year, and other physical agencies. Hence it is that the machinery of registration, the nomenclature and classification, should be in harmony with the progress of medical science.